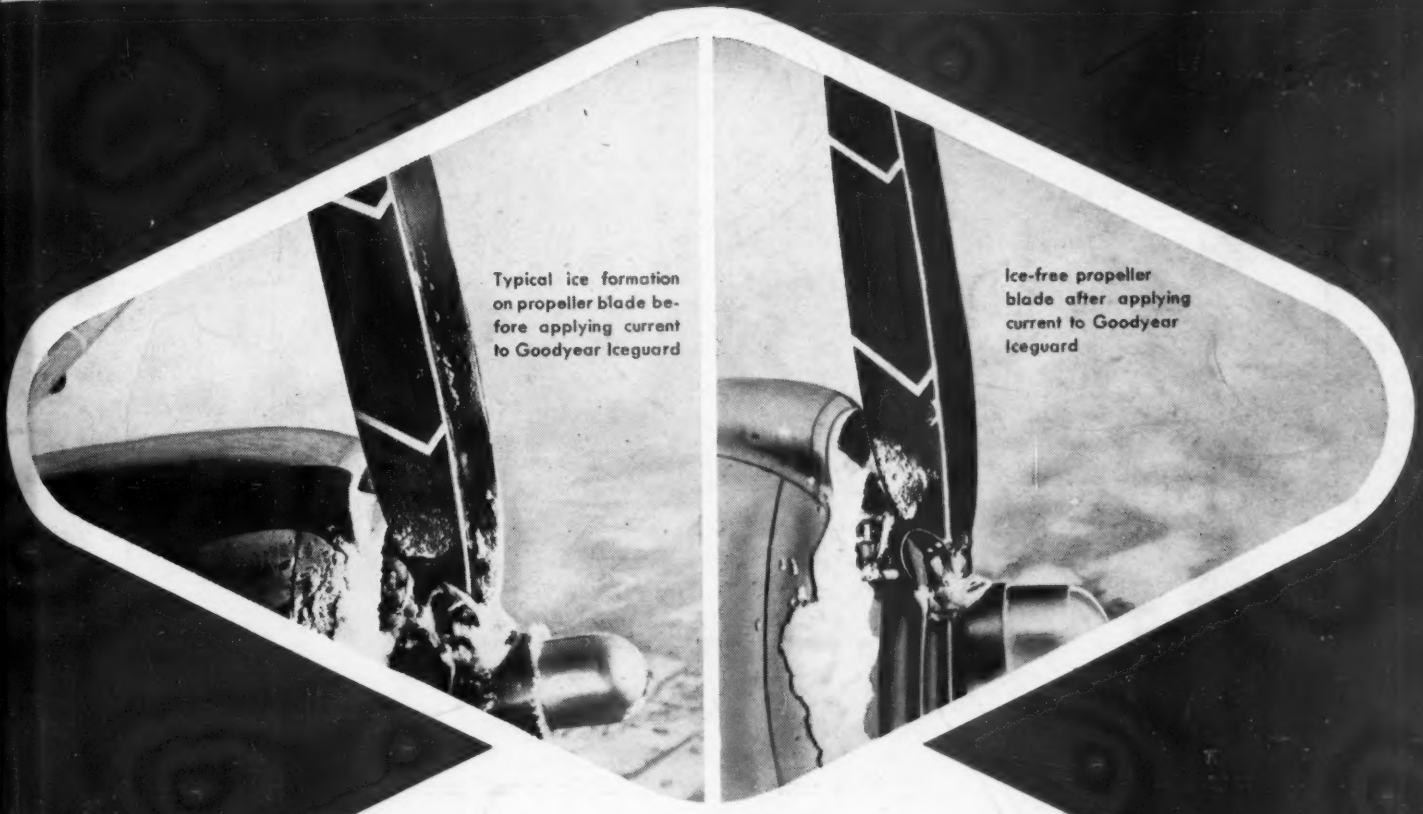
v.48
#10

AVIATION WEEK

MARCH 8, 1948

A McGRAW-HILL PUBLICATION



Typical ice formation on propeller blade before applying current to Goodyear Iceguard

Ice-free propeller blade after applying current to Goodyear Iceguard

Putting the heat on ice

And now, another great Goodyear first — the Iceguard — first successful thermal de-icer boot for propeller blades. By employing an amazing new Goodyear rubber compound—*rubber that can conduct electricity*—the Iceguard transmits sufficient heat from the plane's electrical system to cope with propeller ice formation in even the most severe conditions. Extremely dependable, rugged and lightweight, the Goodyear Iceguard is now used on Hamilton Standard Propellers — standard equipment on many types of aircraft. For detailed information concerning the new Goodyear Iceguard and other Goodyear aviation products, write: Goodyear, Aviation Products Division, Akron 16, Ohio or Los Angeles 54, California.

MORE AIRCRAFT LAND ON GOODYEAR TIRES THAN ON ANY OTHER KIND

1898 50 GOODYEAR ANNIVERSARY 1948

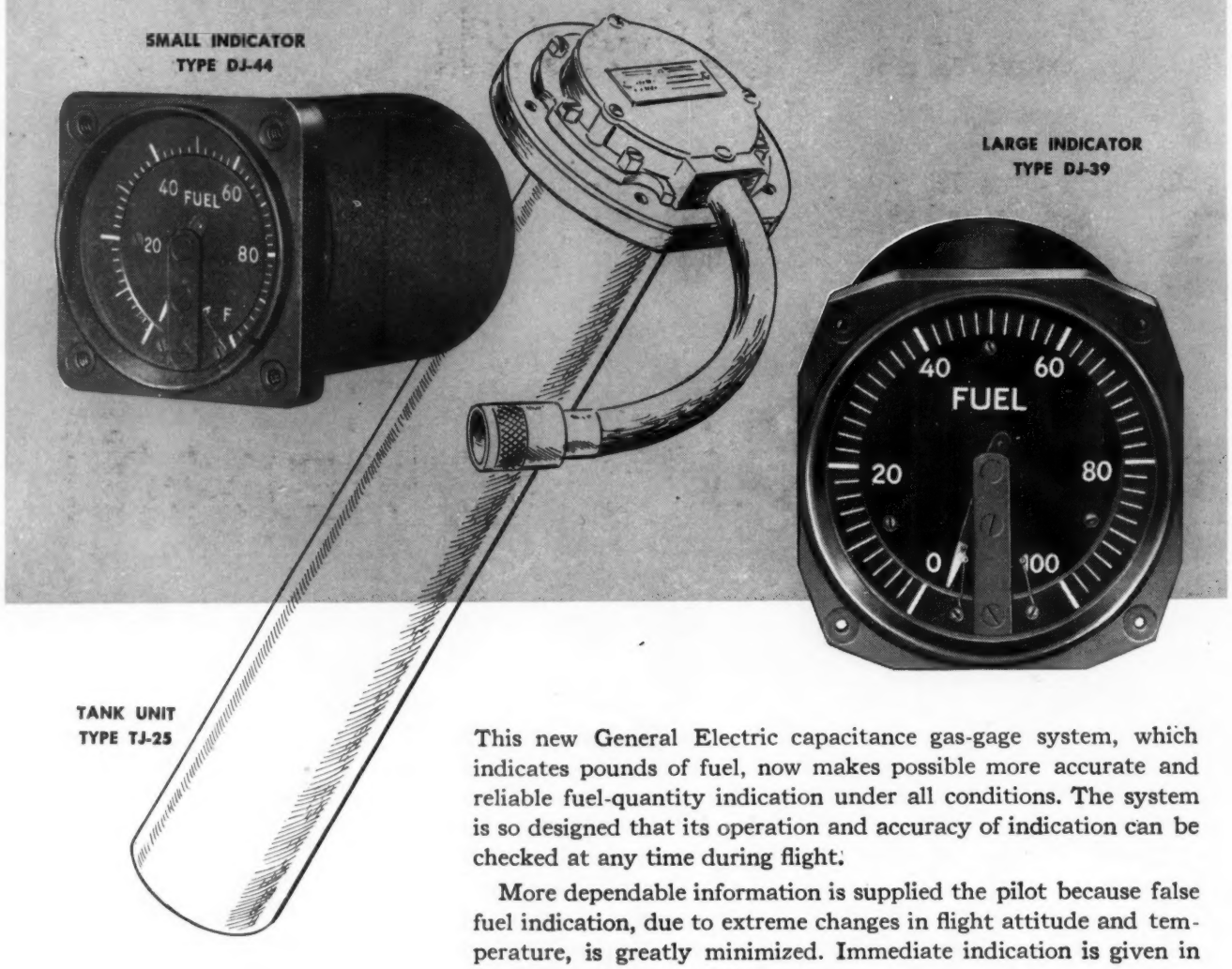
GOODYEAR AVIATION PRODUCTS

Iceguard—T. M. The Goodyear Tire & Rubber Company

DETROIT PUB LIBRARY
TECHNOLOGY DPT
96 PUTNAM AV
DETROIT MICH

LONG-SCALE, LIGHT-WEIGHT, ANTIPARALLAX INDICATORS

CAPACITANCE GAS-GAGE SYSTEM



This new General Electric capacitance gas-gage system, which indicates pounds of fuel, now makes possible more accurate and reliable fuel-quantity indication under all conditions. The system is so designed that its operation and accuracy of indication can be checked at any time during flight.

More dependable information is supplied the pilot because false fuel indication, due to extreme changes in flight attitude and temperature, is greatly minimized. Immediate indication is given in the event of a power failure.

Totalized quantities of fuel in various tanks are obtainable on a single indicator. There are no moving parts in the tank units—a feature which reduces to the minimum installation problems, service, and maintenance.

For complete information on this new fuel-indicating system, contact your nearest G-E sales office or write for bulletin GEA-4873. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*

Small or large size A-N style indicators—low power consumption—little unmeasured fuel—2% accuracy under standard conditions—radio shielded—empty- and full-scale adjustments—indication not affected by foaming or surging—wide spacing between the tank unit tubes—versatile system

GENERAL ELECTRIC

607-14

TECHNOLOGY DEPARTMENT

PUBLIC LIBRARY
MAR 9 - 1948
DETROIT

EVERY JET
EVERY BOMBER
EVERY FIGHTER
EVERY TRANSPORT

is Hydro-Aire equipped!

That's right—every Jet, Bomber, Fighter and Transport being manufactured in the United States today is equipped with fuel, hydraulic or pneumatic equipment designed and manufactured by Hydro-Aire.

Our Development Engineers will be happy to discuss specific problems with you. General Catalog will be sent only upon request. Write: Hydro-Aire, Incorporated, 3000 Winona Avenue, Burbank, California.

HYDRO-AIRE
INCORPORATED

BURBANK, CALIFORNIA • ANNAPOLIS, MARYLAND

One of America's Foremost Manufacturers of Fuel and Hydraulic Equipment

Manual & Electric Operated Selector & Shut Off Valves • Gate Valves • Fuel Filters • Oil System Equipment • Hydraulic Selector, Shut Off & Check Valves
Hydraulic Shuttle Valves • Relief Valves, Combination Valves • Actuating Cylinders • Heat & Vent Control Valves • Pneumatic Control & Check Valves

The data you want
COMPLETE
CONVENIENT
AUTHORITATIVE
for new projects

Flight Testing

for Conventional AND JET-PROPELLED Airplanes

BY BENSON HAMLIN, *Project Engineer, Bell Aircraft Corporation*

Fully explains and standardizes the methods of analyzing test data on all aspects of plane performance for all types of planes. Explains aerodynamic theory and the theory and general characteristics of the turbo-jet engine from the practical flight test point of view. Tells specifically what data are needed, how acquired, how interpreted. Written by the author of manuals on data reduction methods used as standard guides during the war—a man who has been Senior Flight Research Engineer and consultant for five of the largest aircraft concerns —this book is invaluable for all developmental work.

24 9x6½ graphs for simplifying calculations • 19 tables of useful data • complete tables of standard notation conveniently placed on end-papers • 147 pp., 8¼x11, 128 figs. $5.00

"The first American reference manual of authority and detail."
— AERONAUTICAL ENGINEERING REVIEW

The work you want • •

Aircraft Drafting

By Kats. Complete, thoroughly professional preparation for work in the aircraft drafting room by a man who has trained hundreds of draftsmen for Consolidated and Republic. Exact, easy-to-learn instruction in all techniques and procedures used in the big plants today. Teaches all basic technical drawing, emphasizing the particular practices of aircraft drafting, pictorial drawing and lofting; and, in addition, gives a wealth of production and engineering information usually acquired only through long experience. Excellent for self-instruction or for the training of new workers.

Over 1000 large detail drawings. 45 tables of data. 384 pp., 8¼x11. $5.00

Aerodynamics

By Parkinson. Brief and clearly written, this book gives you a familiarity with the terminology of aerodynamics and a knowledge of the theory and use of basic formulas valuable for any work in aviation. $2.50

EXAMINE THEM FREE

The Macmillan Co., 60 Fifth Ave., N. Y. C. 11

Please send me copies of the books checked below on ten days' approval, with the privilege of returning them free of charge.

☐ **Flight Testing** ☐ **Aircraft Drafting**
☐ **Aerodynamics**
(*Postage prepaid on cash orders*)

Signed.....

Address.....

Company.....

Vol. 48 No. 10

AVIATION WEEK

Mar. 8, 1948

News Sidelights	7	Financial	17
News Digest	8	Engineering-Production	18
Headline News	11	Sales & Service	35
Aviation Calendar	15	Briefing for Dealers	37
Industry Observer	15	Transport	39
Letters	16	Editorial	50

Robert H. Wood
EDITOR

Merlin H. Mickel
MANAGING EDITOR

Robert B. Hotz	News Editor	Albert E. Smyser, Jr.	Engineering
Irving Stone	Technical Editor	Scholer Bangs	Pacific Coast Editor
William Kroger	Manufacturing	Katherine Johnsen	Congress
Alexander McSurely	Sales & Service	Stanley L. Colbert	Production Editor
Charles L. Adams	Transport Editor	Marie Adams	Editorial Assistant
Robert McLarren	Engineering	Victoria Giaculli	Editorial Makeup

Executive and Editorial Offices: 330 W. 42nd St., New York 18, N. Y.; National Press Bldg., Washington 4, D. C.

Domestic News Bureau: Atlanta 3, Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 14, 621 S. Hope St.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents:* Boston, Buffalo, Dallas, Dayton, Denver, Indianapolis, Jacksonville, Kansas City, Knoxville, Lansing, Louisville, Memphis, Miami, Milwaukee, New Orleans, Oklahoma City, Ogden, Philadelphia, Phoenix, Pittsburgh, Portland (Ore.), St. Louis, Salt Lake City, Wichita and 43 other cities.

Foreign News Bureau: London, Paris, Berlin, Moscow, Tokyo, Bombay, Melbourne, Rio de Janeiro, Buenos Aires. Correspondents in Athens, Caracas, Santiago, Shanghai, Zurich, Rome, Johannesburg and over 40 other cities.

ECONOMIC STAFF

Dexter M. Keezer, Sanford S. Parker, William F. Butler, John D. Wilson

Robert F. Boger
PUBLISHER

J. C. Anthony
MANAGER

Business Manager, J. G. Johnson *Research,* W. D. Lanier

R. W. Martin, Jr., *Sales Manager;* M. J. Storz, New York and Philadelphia; V. K. Dissette, Cleveland; L. J. Biel, Chicago; W. G. Ashmore, Atlanta; J. W. Otterson, San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, Detroit, St. Louis, Boston and London.

Member of Associated Business Papers, Inc., and the Audit Bureau of Circulations

McGRAW-HILL PUBLISHING CO., Inc., Publishing Office, 99-129 N. Broadway, Albany, N. Y. Return postage guaranteed. Editorial and executive offices: 330 W. 42nd St., New York 18; 520 N. Michigan Ave., Chicago 11; 68 Post St., San Francisco 4; Aldwych House, London, W.C. 2; National Press Bldg., Washington 4, D. C.; Architects Bldg., 17th & Sansome Sts., Philadelphia 3; Hanna Bldg., Cleveland 15; 2980 Penobscot Bldg., Detroit 26; Continental Bldg., St. Louis 8; 1427 Statler Bldg., Boston 16; Rhodes-Haverty Bldg., Atlanta, 3; 621 South Hope St., Los Angeles 14; 738-9 Oliver Building, Pittsburgh 22. JAMES H. McGRAW (1860-1948), Founder; JAMES H. McGRAW, Jr., President; CURTIS W. McGRAW, Senior Vice-President and Treasurer; JOSEPH A. GERARDI, Secretary; NELSON BOND, Director of Advertising; EUGENE DUFFIELD, Editorial Assistant to President; J. E. BLACKBURN, Jr., Director of Circulation . . . Aviation Week, 330 W. 42nd St., New York 18. Published weekly, price 50¢ a copy, 50¢ in Canada. Allow at least ten days for change of address. Address all communications about subscriptions to Director of Circulation, 330 W. 42nd St., New York 18, N. Y. Subscription rates—United States and possessions, $5 a year, $8 for 2 yr., $10 for 3 yr. Canada, $6 for 1 yr., $10 for 2 yr., $12 for 3 yr., payable in Canadian currency at par. Pan American countries, $10 for one yr., $16 for 2 yr., $20 for 3 yr. All other countries, $20 for 1 yr., $30 for 2 yr., $40 for 3 yr. Please indicate position and company connection on all subscription orders. Entered as second class matter July 16, 1947, at Post Office, Albany, N. Y., under Act of March 3, 1879. Volume 48, Number 10. Printed in U. S. A. Cable address "McGraw-Hill New York". Member A.B.C.

Copyright 1948, McGraw-Hill Publishing Co.

Aviation Week is indexed in "Reader's Guide to Periodical Literature" and in "Industrial Arts Index." Following publications are combined with AVIATION WEEK: AVIATION, AVIATION NEWS, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL.

All rights to these names are reserved by McGraw-Hill Publishing Co.

SPINNING
WEAVING
DYEING
FINISHING
The Reeves Fabrics Group
"NEW LOOK"
FOR INDUSTRIAL
UNIFORMS
The industrial uniforms illustrated were sketched from the Helen Cookman designs shown recently by Reeves Brothers at the St. Regis Roof in New York City.

AN ACCELERATED interest is being shown by many industries in the uniforming of their employees. Safety, comfort, efficiency, economy, employee morale and public good will are the factors being given careful consideration in the development of these industrial garments.

Reeves Brothers, through its textile and garment design research and by virtue of wide experience gained during World War II, is in a pre-eminent position to help in the selection of high quality cotton fabrics.

Woven from high grade cottons, Sanforized Shrunk* and vat dyed in a wide variety of appealing colors, the Reeves Fabric Group offers a wide range to choose from. Each fabric has been developed with an eye to its fitness for the purpose for which it is intended. Whatever your problems, call or write us for information concerning fabrics for industrial uniforms, utility and work clothing.

**Residual shrinkage less than 1%.*

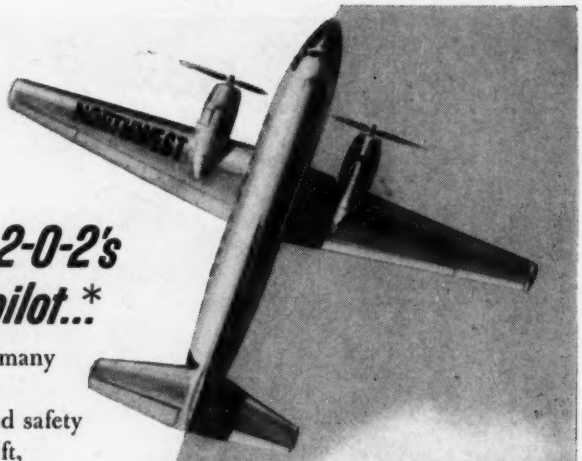
"FROM COTTON TO CUTTER"

THE REEVES FABRIC GROUP INCLUDES: Reeves Army Twill • Reeveking Gabardine • Glengarrie Poplin Marine Herringbone • Byrd Cloth • Warrior Twill Mountain Cloth • Pima King Broadcloth Reevecord • Parklyn Pique

MADE OF FINE COTTONS

REEVES BROTHERS, INC. • 54 WORTH STREET, NEW YORK 13, N. Y.

REPRESENTATIVES IN: *Akron • Atlanta • Boston • Chicago • Dallas • Los Angeles • Philadelphia • Portland, Oregon • St. Louis • Montreal • Toronto*



Northwest's Martin 2-0-2's fly with Sperry Gyropilot...*

Northwest Airlines has joined the many leading airlines that bring to their passengers the additional comfort and safety provided by automatic flight. The swift, luxurious Martin 2-0-2's that fly Northwest's "Overland Route" from coast-to-coast are now equipped with the Sperry A-12 Gyropilot to help the pilot do his job better.

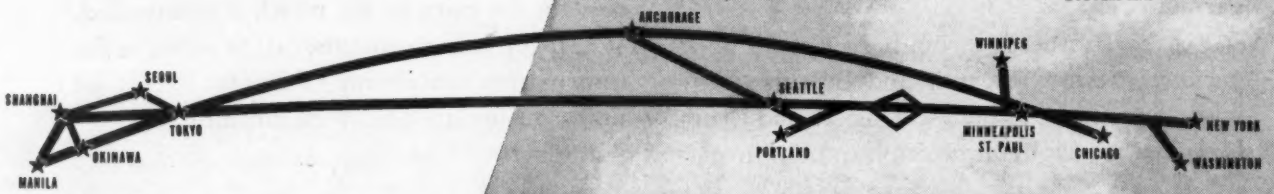
for smoother travel under all flight conditions...

The Sperry Gyropilot gives the human pilot complete automatically stabilized control of his aircraft at all times . . . enables him to keep his plane proceeding smoothly on course and on time regardless of weather . . . lessens his tension and fatigue.

more passenger comfort and greater schedule reliability

Thus, the Sperry Gyropilot's accurate control of the aircraft brings to passengers the comfort of smooth flight even in rough air . . . to the pilot relaxation and higher efficiency . . . to the airline operator greater schedule reliability.

* Trade-Mark Reg. U. S. Pat. Off.



SPERRY

SPERRY GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION · GREAT NECK, N. Y.

NEW YORK · CLEVELAND · NEW ORLEANS · LOS ANGELES · SAN FRANCISCO · SEATTLE

NEWS SIDELIGHTS

Profits Don't Pay?

Unique in the domestic air transport picture as a substantial money-maker in 1946 and 1947, Eastern Air Lines is to be penalized by recent CAB decisions. The carrier claims routes granted PCA and Delta in the Boston-New Orleans case and awards to National in the Middle Atlantic area decision expose $10,000,000 worth of EAL traffic to diversion annually.

Should CAB adopt its recent examiner's recommendation that Pan American be given a New York-Miami link, Eastern again will be the principal loser.

Many observers believe the Board's two-to-one decision against certificating Colonial for a New York-Washington route was a crowning blow to that line's efforts to become independent of heavy mail subsidy.

Navy-Air Force Transfers

Legislation enabling Naval Air officers to transfer to USAF can be expected in this session of Congress. It will touch off a new inter-service row.

In a last minute action, Congressional Air Policy Board struck out a recommendation for legislation authorizing personnel transfers between the Navy and the Air Force and Army. Transfers can now be made between the Air Force and Army.

Some Board members, however, feel that USAF now suffers from a dearth of experienced high-ranking officers in the 43-53 age bracket while the Navy has a substantial supply of such officers.

Administrators Scarce

Promoters of super-agencies for over-all research planning and coordination are stymied by the scarcity of qualified research administrators to head such agencies.

As a result of this shortage, it has proved impossible so far to form one over-all supervisory board, panel or committee, the members of which do not serve on other boards, panels or committees or are not officers of an agency subordinate to such an overall agency.

For example, Dr. Vannevar Bush, Dr. Jerome C. Hunsaker, and Dr. Hugh Dryden serve on a total of nine major and 14 other committees in the general research field.

Air Force and Naval Aviation officers expand this total to almost 50.

Thus, a chain of command is sheer impossibility when a given administrator sits on a board which in theory directs his administration. Most observers, paradoxically, believe this situation the most effective assurance of the prevention of duplication and coordination of the research effort of the nation.

War in Speech & Paper

Air Force generals have been scaring various public gatherings recently with dire predictions of a one-night air blitz preview of the next war. Latest was Maj. Gen. Orville Anderson, commander of the Air Force Tactical School, who told the U. S. Conference of Mayors that the next war might be settled in a single night.

At the War College in Washington the Reds and the Blues representing the United States and Russia have been fighting the next war on their large scale maneuver boards for three months with neither side yet close enough to the other's vital targets to be able to hit them with an atom bomb.

Prague Link Weakens

Watch for the State Department to cancel U. S. bilateral air agreement with Czechoslovakia. If the Department lags in taking action, Congressmen—who have long been wary that Russia would use a satellite nation to obtain operating rights in the U. S. without giving U. S. reciprocal rights in Russia—will bring pressure. Cancellation of the bilateral would affect Pan American, which has continued operations into Prague since the political coup which brought Czechoslovakia under Moscow domination.

Planning Legislation

Although the Congressional Air Policy Board officially expired March 1, members continue to work together on legislation to implement the Board's recommendations. Plan of Sen. Owen Brewster who served as board chairman, is to promote Congressional action on non-controversial aviation legislation first.

Rapid action by Senate and House Interstate and Foreign Commerce Committees on Board-proposed civil aviation bills is expected, since both committees were well represented on the Board. All five Senate members of the Board were from Senate Interstate; three of the five House members on House Interstate.

More CAB Names

Former Democratic Sen. Hugh Mitchell of Washington has told friends in the Senate that President Truman offered him the CAB chairmanship, but he turned it down.

Rear Adm. H. B. Miller, who served as director of the Congressional Air Policy Board, is currently being mentioned among others as a board possibility.

CAB Examiner Tom Wrenn has the support of minority leader Sam Rayburn for a board post.

Who'll Win the Marines?

Far from eliminating inter-service problems and in-fighting under the Unification Act, the law has actually increased the number and intensity of these rows since all three services have moved under a single tent.

In addition to the long and never more bitterly fought Air Force-Navy row over who shall be charged with strategic bombing and command of land-based planes, the Army and Navy are now fighting for control of the Marines.

Attempts to iron out the differences between President Truman's Executive Order on unification and the Congressional act, which are at the root of many new disputes, have been notably unsuccessful.

NAL Strike Tension

The National Airlines walkout is probably costing the Air Line Pilots Association well over $10,000 a week in benefits to idle members. Assessments by ALPA against pilots employed by other airlines will keep the union war chest full for the time being. But if the strike drags on grumbling against the levy is sure to rise. Bitterness in the strike far exceeds the feeling in the TWA and American Overseas Airlines walkouts. Public pronouncements on the issues of the dispute are being submerged by strong behind-the-scenes personal attacks on the two main personalities involved—ALPA President David L. Behncke and NAL President G. T. Baker. Hope is high in some quarters of the air transport industry that a wedge can be driven between the ALPA membership and Behncke on the ground that the union chief uses the strike weapon unnecessarily.

All the outstanding advantages of VHF communication and navigation are combined in two new Systems designed and manufactured by Aircraft Radio Corporation.

THE TYPE 15A VHF OMNI-DIRECTIONAL RANGE RECEIVING SYSTEM provides an unlimited number of courses from the new VHF Omni-Directional Ranges, as well as operation on VHF Runway Localizers and Visual-Aural Airways Ranges. Simultaneous voice feature is included on these ranges. The *tunable* A.R.C. Receiver makes it possible to receive VHF communications on *any* frequency selected while in flight – no need for several receivers to cover the entire VHF band.

THE TYPE 18 VHF TRANSMITTING SYSTEM normally is used in combination with the Type 15 to provide complete 2-way VHF Communication – or it may be used alone for dependable, powerful VHF Transmission. Additional transmitters may be added to cover a wider range of frequencies if such coverage is required.

Units of the Type 18 System have been Type-Certificated by the CAA for use by scheduled air carriers. Yet their light weight and moderate cost make them ideally suited to the operational requirements of executive-type aircraft. Other combinations of A.R.C. equipment are available to meet every operational need.

The dependability and performance of these VHF communication and navigation systems spells increased safety in flight, more efficient aircraft operation. Specify A.R.C. for your next installation.

Aircraft Radio Corporation
Boonton, N. J.
DEPENDABLE ELECTRONIC EQUIPMENT SINCE 1928

NEWS DIGEST

DOMESTIC

Boeing Stratocruiser completed nine flights of 23 hr. in its CAA certification program under the direction of A. M. Alcorn, CAA type certification board vice chairman. First Boeing B-50 completed 100 hr. of flight testing under Air Force direction.

Registered civil aircraft of the U. S. increased 13,819 during 1947 to a new high total of 94,821 of all types. California continues to lead the list with 10,221 aircraft registered in that state.

Wisconsin Central Airlines has become the 10th feederline to inaugurate certificated operations. First service, with four Lockheed Electra 10 place transports, was instituted between 19 cities in Wisconsin, Illinois and Minnesota.

Trans Caribbean Air Cargo Lines, New York, has been fined $1500 in Federal Court for carrying passengers to foreign points in violation of the Civil Aeronautics Act.

FINANCIAL

Breeze Corp. Inc. reports net loss for 1947 of $69,315 after giving effect to $300,000 recovery of Federal taxes. This compares with a 1946 net loss of $320,397 after $1,300,000 tax credit. Sales for 1947 totalled $7,258,971 compared to $2,735,948 for 1946.

Solar Aircraft Co. reports net profit of $514,817 for nine months ended Jan. 31 on let sales totaling $10,413,687. This is the equivalent of $1.01 a share on 452,650 common shares. Net profit for six months ended Oct. 31, 1947 was $395,147 or 79 cents a common share.

Stewart-Warner Corp. declared cash dividend of 25 cents per share on $5 par value common stock payable April 10, 1948, to holders of record March 11, 1948.

FOREIGN

Australian National Airways has applied for rights to operate two routes between Sydney, Australia and London, England via the United States. One proposed link is from Sydney to San Francisco, New York, Newfoundland, Ireland and London; the other from Sydney to San Francisco, Mexico City, Havana, Bermuda, the Azores and London.

U. S. and Great Britain have signed an agreement opening to commercial aircraft seven American air bases on British territory in the Caribbean and Bermuda.

Mr. W. W. Davies' position as Director of Engineering for United Air Lines causes him to look at aircraft with a practical eye.

"When United buys a new type, of course we check design, construction and all the rest.

"But we go even farther. We ask, 'How much money can this airplane earn for us? How does payload compare with operating cost?' You see, with us, it's a matter of dollar and cents.

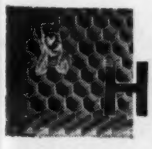
"That's why we're always glad to see 'Honeycomb' used. Because it saves weight. And every pound of dead weight saved shows up on the black side of the operating ledger."

In United Air Lines' DC-6 Mainliner 300's, built by Douglas, Honeycomb is used in many places to save important pounds: Vertical Cabin Partitions . . . Coatroom Shelves . . . Main Entrance Ceiling Panels . . . Magazine Racks . . . Card Tables . . . Lounge Tables . . . Mirror Backing . . . Cabin Stowage Cabinets.

Honeycomb cores are made from impregnated cloth, paper, Fiberglas or other materials, depending on requirements. The core is faced with decorative wood veneers, aluminum, stainless steel or plastic . . . to fit any need for a lightweight, yet very strong and stiff structural material.

Weldwood and Armorply Honeycomb have an amazingly high strength/weight ratio. Extremely light, the core weighs only 4 pounds per cubic foot.

Full engineering data on Honeycomb is available on request. Write for complete details.



WELDWOOD and ARMORPLY
HONEYCOMB made by { UNITED STATES PLYWOOD CORPORATION
55 West 44th Street, New York 18, N. Y.

Manufacturers of Weldwood Flat and Molded Plywood, Armorply*, Flexmetl, Industrial Adhesives, Plastic Laminates and parts.*

*Reg. U.S. Pat. Off.

Nothing Rolls Like a Ball . . .

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • Division of GENERAL MOTORS • BRISTOL, CONNECTICUT • Branches in all principal cities

Vol. 48, No. 10

AVIATION WEEK

Mar. 8, 1948

CAA Budget of $149,370,000 Is Approved By House Committee

Rep. Karl Stefan credited with more lenient attitude of appropriations group toward CAA; air safety funds survive. New budget is record.

A record budget for the Civil Aeronautics Administration for the coming year, totaling $149,370,000, was approved last week by the House Appropriations Committee. This represents a boost of $30,055,666 over CAA's current budget of $119,314,334.

The liberality of the committee—last year it slashed the President's estimate for the agency by over $65,000,000—was unexpected but welcomed by aviation circles. It is due largely to Rep. Karl Stefan (R., Neb.), chairman of the Appropriations Committee's Commerce Department subcommittee.

As a member of the Joint Congressional Air Policy Board, Stefan gained new insight and understanding of civil aviation and used his appropriations committee post to implement the Board's recommendation for a vigorous civil aviation program as a part of national defense.

▶ **CAB budget**—A $3,450,000 budget for the Civil Aeronautics Board was recommended by the committee. This is $410,000 above CAB's current-year appropriation, but $200,000 below the President's estimate. A proviso boosts the salary of the CAB chairman from the present $10,000 a year to $12,000.

Expressing apprehension over CAB's gigantic backlog of business, the committee pointed to CAB Member Harllee Branch's report that the mail rate cases pending before the board involve over $232,000,000 and the pending certificate cases represent two years' work of CAB's present staff. Over the past eight years, the committee reported, CAB has requested a cumulative total of $19,944,928 in appropriations. Budget Bureau cuts in CAB requests over the period, it was said, total $3,312,716, and Congress' cuts, only $780,689.

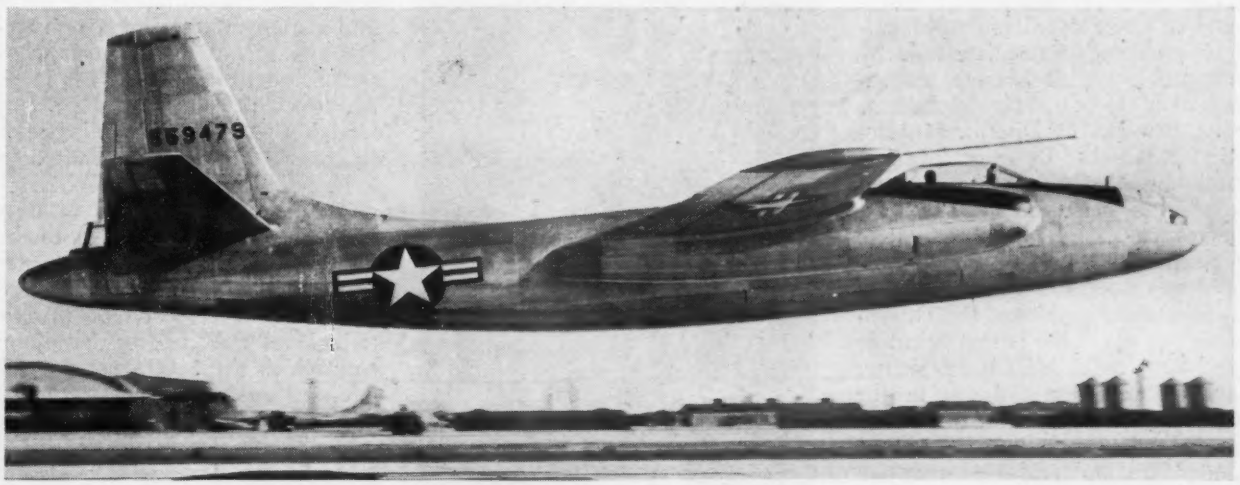
▶ **Trim CAA Budget**—"It can readily be seen that action of the Congress in making appropriations for the Board is not the cause of the present admitted backlog of over two years' work", the committee commented. "The cause, it appears. . . . is lack of a long-term airways pattern, lack of administrative foresight, and indecision. . . . CAB must set its own house in order."

The committee did trim $6,200,000 from the $155,570,000 requested by the President for CAA. Of the cut, $5,000,000 was for administrative personnel which, the committee pointed out, either could not be recruited or which were deemed superfluous; $200,000 was for technical development considered unnecessary; and $1,000,000 for an experimental traffic-indicating system.

Details on CAA's coming-year budget:

• **Salaries and Expenses, $82,451,000.**—This amount, approved by the committee, is $5,000,000 below the budget estimate of $87,451,000, but $9,488,232 over the current-year allocation of $72,962,768. The major activity which would be affected is the operation of the Federal airways system. CAA plans call for stepping up the program from the $38,892,000 allocated to it this year to $46,787,786, increasing personnel from 10,596 to 12,643. The committee pointed out CAA has recruited only 8975 of the 10,596 called for in its current-year program and expressed doubt that it would be able to recruit the additional personnel next year.

The committee specificaly cut out



JET BUZZ JOB AT MUROC

North American's prototype XB-45, four-jet bomber, hurtles down the runway only a few feet off the ground in a spectacular buzz job at better than 500 mph. Purpose of the low level run was speed calibration test at USAF Muroc desert test center. B-45A's are in production at North American's Long Beach, Calif., plant.

$500,000 asked for business management purposes, criticizing CAA for duplication of administrative activities in headquarters and field offices. This would reduce the agency's business management budget from the $4,901,742 recommended by the President to $4,401,742.

Highlighting the importance of air safety measures, the committee directed CAA not to apply any portion of its $5,000,000 cut to the $11,181,355 requested for enforcement of safety regulations. While applauding the agency for expanding its designee system from 4000 to approximately 10,000 designees over the past year, the committee called for an even greater extension of the system and the shifting of responsibility for safety on private industry. "Still greater responsibility should be placed on the manufacturer, who is perhaps even more than CAA interested in the quality of his product."

The committee reiterated its position that traffic control tower operations should be financed by cities, but approved the $7,830,335 recommended for CAA operation of the present 153 towers, plus 15 additional proposed for the coming year program. It explained that refusal to grant the funds would hazard the program. The committee called on CAA, however, to map out a long-range plan looking to local financing.

A fleet of 95 aircraft CAA proposed to operate—compared with its present fleet of 231—was reduced to 85 by the committee. The Administration's plan to rent planes from uncertificated carriers was enthusiastically approved. For this purpose, $395,000 was allocated.

• **Establishment of Air Navigation Facilities, $22,099,000**—This consists of $10,099,000 cash and $12,000,000 contract authority. The total represents a boost of $10,949,934 over CAA's current-year allocation of $11,149,066, and a net reduction of $1,000,000 in the President's request of $23,099,000. The President requested an all-cash allocation, but the committee recommended that $12,000,000 take the form of contract authority, after CAA officials estimated that only $3,400,000 actually would be expended on the air navigation facilities program planned for the coming year. The $1,000,000 cut was for the traffic-indicating system which the committee reported "still in the experimental stage" and suggested that "experimenting should be conducted by manufacturers who expect to derive profits from the sale of their products to the government."

• **Technical Development, $1,800,000.**—This is $200,000 below the President's request, but $200,000 above CAA's current-year appropriation. In cutting the item, the committee explained "many of the research programs which the administration has been engaged in in the past have proved of not too great significance."

• **Airports, $40,000,000**—This comprises $3,000,000 cash and $37,000,000 contract authority. This is the amount proposed by the President and an increase of $7,50,000 over the current-year appropriation. After being informed that out of the total of $77,500,000 appropriated for airports to date, only $2,607,738 actually has been expended and only an additional $24,917,588 obligated, the committee voted for the contract authorization of $37,000,000. The $3,000,000 cash provided would give the Administration working funds for administrative activities.

• **Washington Airport, $3,020,000**—This is the amount recommended by the President and an increase of $1,917,500 over the $1,102,500 allocated for current year. Of the total, $1,185,000 is for operation and $1,835,000 for construction, including an addition to the terminal building. The committee noted the rise in revenue at airport from $595,000 in 1945 to an estimated $1,065,000 in the current fiscal year.

Presenting Hugh Dryden of NACA

New Research Director's administration to give increased attention to aircraft industry's design and operational problems.

By ROBERT McLARREN

More attention to current operational problems of the aircraft industry and a closer coordination of current research with immediate industry design problems will keynote the administration of Dr. Hugh Latimer Dryden, new NACA Director of Aeronautical Research. By expanding and streamlining NACA's committee and subcommittee organizational structure, by increasing regard for subcommittee recommendations and by speedy creation of new special subcommittees to meet immediate problems, Dr. Dryden is aiming to guide the potent scientific research capacity of NACA into greater integration with the industry in the solution to specific problems through basic research.

Current examples of this attention to specific problems is the NACA program for the evaluation of handling characteristics of multi-engine transport planes, the flutter and vibration of helicopter rotors and the application of low speed aerodynamic characteristics of a variety of aircraft configurations to personal aircraft design. About 2000 industry technicians visit the three NACA laboratories annually concerning their specialized problems and up to 53 industry or military representatives are constantly on duty in the NACA research facilities in connection with specific design problems.

Dryden

▶ **High Speed Program**—Dr. Dryden points out that high speed aerodynamics will continue to occupy the major attention of the NACA laboratory staffs because of the current need for such information in the design of new Air Force and Navy fighter planes. This work is not confined to basic research. About 20-30 percent of the current total NACA effort is applied research on specific high speed aircraft designs. Whereas such work by NACA in the past (about 80-90 percent of its wartime effort was applied research on military aircraft and engines) precipitated criticism by industry, Dr. Dryden feels that the current ratio of applied to basic research is about the minimum with which the NACA can keep itself informed on industry needs and maintain a realistic approach to its broad research tasks.

▶ **Dryden No Stranger**—Dr. Dryden is no stranger either to the NACA or to high speed aerodynamic research, being one of the pioneers in investigations of the aerodynamic characteristics of airfoils at speeds approaching sound.

Following his graduation from Johns Hopkins University, Dryden joined the National Bureau of Standards in the summer of 1918 as an inspector of munitions gages. He continued his post-graduate studies at the Bureau under the late Dr. Joseph S. Ames, then professor at Johns Hopkins and chairman of the NACA executive committee (NACA Ames Laboratory, Moffett Field, Calif. was named after Dr. Ames). Dr. Ames took special interest in Dryden and guided him into aeronautical research work following the Armistice. Dryden was assigned to the wind tunnel division of the Bureau of Standards in 1920 and began pioneering work in the aerodynamics of high speed.

In 1923 the General Electric Co. at Lynn, Mass. produced for a South Africa customer a large turbine-driven three-stage centrifugal compressor capable of delivering 50,000 cu. ft. of air per minute at a pressure up to 15 lb. per sq. in. Hearing of this Dryden, Dr. Lyman J. Briggs and Lieut. Col. Gordon F. Hull, Ordnance Dept., U.S.A., made arrangements for the trio to utilize this airflow for airfoil tests during the routine tests of the compressor prior to delivery.

▶ **Irregular Flow**—Because the scientists were allowed to use the output of the compressor only during routine company tests, the flow varied widely and abruptly from supersonic to subsonic and frequently contained lubricants and small filings. Trips to Lynn followed at irregular intervals and odd hours (including a hurried summons on Christmas Eve, 1923 which took Dryden away from home for Christmas) but the work continued and resulted in NACA Report No. 207, which revealed at this early date the now well-known loss of lift, increase in drag and shift of the center of pressure towards the trailing edge of an airfoil at Mach number 0.8-0.9 and higher.

Dryden's work with Briggs continued until 1928 and produced much of the basic data on which modern high speed aerodynamic relationship is based.

▶ **Boundary Layer Research**—It was during 1928 that Dryden began research on boundary layer turbulence, a subject in which he has made outstanding scientific contributions and for which he is chiefly famed, both here and abroad. Through the use of a hot-wire anemometer (a hot platinum wire in which a variation in airspeed produces a variation in resistance and therefore a drop in voltage across the wire) Dryden and his associates at the Bureau of Standards developed much of the modern theory of boundary layers and their significance in airfoil drag reduction.

In 1934 Dryden was named director of the Division of Mechanics and Sound and subsequently Assistant Director and Associate Director of the Bureau of Standards. During this period he served as vice chairman of the NACA Committee on Aerodynamics, chairman Subcommittee on High-speed Aerodynamics, chairman Special Committee on Self-propelled Guided Missiles and member Committee on Jet Propulsion.

▶ **Dryden Bat**—With the outbreak of war, Dryden was named consultant to the National Defense Research Committee and began research on guided missiles which led to the NDRC-Dryden "Bat", a radar-guided glide-bomb which proved to be the first U. S. guided missile to see actual combat in World War II. Dryden directed the research effort of a team of Bureau of Standards, Navy Department and Radiation Laboratory personnel.

Final result of his research was the famed "Bat", which scored numerous hits during the Okinawa campaign on Japanese shipping. Dropped from Navy patrol and fighter planes, the "Bat" "homes" on radar pulses received from its target and is guided to self-destruction by its 1000 lb. bomb load. Dryden continued his guided missile research work until January, 1947 when he relinquished his duties in favor of administrative work as Associate Director of the Bureau of Standards. He was named NACA Director of Aeronautical Research last August.

ELEPHANTINE GRACE IN THE AIR

Irreverent references to the "barndoor" nature of the Convair XC-99 on the ground are artfully dispelled by this flight view portraying its basic cleanness and beauty. On third flight pictured here the behemoth carried 11,590 gal. fuel, 1176 gal oil and 12,775 gal. water ballast. Three hour flight tested airspeed calibration and general handling characteristics. Fourth flight was scheduled recently to test propellers. Convair flight tests are expected to be completed late summer after 100 air hours and $10,000,000 giant turned over to Air Force. Studies have been completed for installation of quadriwheel landing gear, used on B-36A, to expand landing facilities of XC-99.

Cargo Survey Completed

American Airlines has completed an intensive airfreight sales and survey canvass of Los Angeles. The team of sales engineers and cargo experts was headed by Walter Sternberg, general sales and traffic manager.

Unions Vote at Ryan, Consolidated Plants

San Diego, Calif., has become the testing ground in the battle between the International Association of Machinists (Ind.) and the United Automobile, Aircraft and Agricultural Implement Workers, CIO, for control of aircraft production workers on the Pacific coast.

The day after the National Labor Relations Board held two elections at Consolidated Vultee Aircraft Corp., it directed that another be conducted within 30 days at Ryan Aeronautical Co.

▶ **Convair Elections**—At Consolidated Vultee, the UAW-CIO and the AFL International Brotherhood of Electrical Workers are seeking to represent employees for whom the IAM has held bargaining rights. At Ryan Aeronautical, the IAM is trying to take away from UAW-CIO a contract it has held since it was certified in 1940.

In a craft unit election permitted by the Taft-Hartley law, the IBEW successfully carved Consolidated Vultee's 45 maintenance electricians out of the plant-wide bargaining unit under contract with UAW-CIO. The electricians cast 30 votes for IBEW, none for UAW-CIO, and one for neither union. Nine votes were challenged.

The other election at Consolidated Vultee, covering production, maintenance (except electricians) and plant clerical workers, was inconclusive. The IAM, present contract holder, nosed out the UAW-CIO, 3305 to 3228, but failed to get a majority. A run-off will

be necessary, with both unions trying to woo the 352 who voted for neither union and who will probably decide the election. There were 24 challenged votes. Total eligible was 7500.

The union rivalry at Consolidated Vultee was marked by clashes between IAM and UAW-CIO members outside the plant on Feb. 26, the day before the NLRB poll. UAW-CIO President Walter P. Reuther declared at a union rally that if UAW-CIO won the election it would seek a 25-cent hourly wage increase "to bring wages to the level of those paid for similar work in the automobile industry on the Pacific coast."

Railroads Boost Pay Of Capitol Lobbyist

Indicative of increased railroad interest in legislative matters, Association of American Railroads has boosted the salary of its top lobbyist, J. Carter Fort, by $10,000 a year, bringing his total annual salary to $50,000 and making him one of the highest paid lobbyists registered on Capitol Hill.

Although AAR's chief legislative concerns at present are railroad unemployment insurance legislation, the St. Lawrence Seaway bill and legislation to bar Justice Department from prosecuting railroad agreements approved by Interstate Commerce Commission, airline representatives claim railroad pressure is largely responsible for House Post Office Committee's moves to spotlight government aid to air carriers by requiring separation of cost-plus-reasonable-profit payments for air mail service from "subsidy" payments and to channel air parcel post service to independent airfreight operators. Aviation circles have also long been convinced that railroad pressure was behind appropriation reductions for air safety facilities, airport development, and other projects to promote air as a method of transportation.

Fort's salary boost is disclosed in a memorandum, amending his lobbying registration report filed with the clerk of the House and the secretary of the Senate in December, 1946, which gave his salary as $40,000 a year.

Among the new lobby registrants who filed with the House clerk and Senate secretary during the final quarter of 1947, as required by the 1946 Congressional Reorganization Act:

• **Vernon A. Johnson,** Lockheed Aircraft Corp. Salary, $10,000 a year to April 1, 1948, and $11,000 thereafter, plus entertainment, travel, and other expenses.

• **George C. Van Nostrand,** assistant vice president, American Airlines and American Overseas Airlines. Salary, $10,000 a year, plus expenses.

Quarterly reports filed by lobby registrants for the fourth quarter, 1947, included:

• **Larry Cates,** Air Line Pilots Association. Reported salary of $1,753 and expenses of $183 for services for the three-month period. Legislative activities given as support for measures to increase air safety and improve pilot working conditions.

• **Donald Conn,** representative, Transportation Association of American, alleged railroad "front" organization. Salary, $20,000 a year. TAA's chief and well-publicized activity is promotion of "integration of transportation," including common ownership of different modes.

• **Oliver P. Echols,** president, Aircraft Industries Association. Salary, $25,000 a year. Reported no expenditures for legislative activities for the fourth quarter. Listed primary objective as the promotion of legislation to establish a national air policy.

• **Bon Geaslin,** general counsel, Waterman Steamship Company. Reported no expenditures for activities to promote sea-air legislation during the fourth quarter. Geaslin's salary is understood to be $25,000 a year.

• **Bert Goss,** vice president, Hill & Knowlton. Reported total expenditures of $150 for lunches, cab fare, and phone calls, in connection with activities during the fourth quarter for various clients of the public relations firm, including Aircraft Industries Association.

• **Harold G. Mosier,** Glenn L. Martin Company. Salary, $12,000 a year. Reported expenses totaling $406 for the fourth quarter. Listed activities as participation in all legislation affecting aviation.

• **Robert Ramspeck,** executive vice president, Air Transport Association. Salary, $25,000 a year. Listed activities as support for legislation to repeal the federal transportation tax and establish a national air parcel post system; and opposition to proposals to change existing law in determining compensation for air mail carriage (separation of cost from "Subsidy" payments) and to boost the current 5 cents per ounce air mail rate.

• **Eugene E. Wilson,** Aircraft Industries Association. Reported no expenditures in connection with legislative activities during the fourth quarter. Listed main objective as national air policy legislation.

Bell Sells Six Copters To Argentine Navy

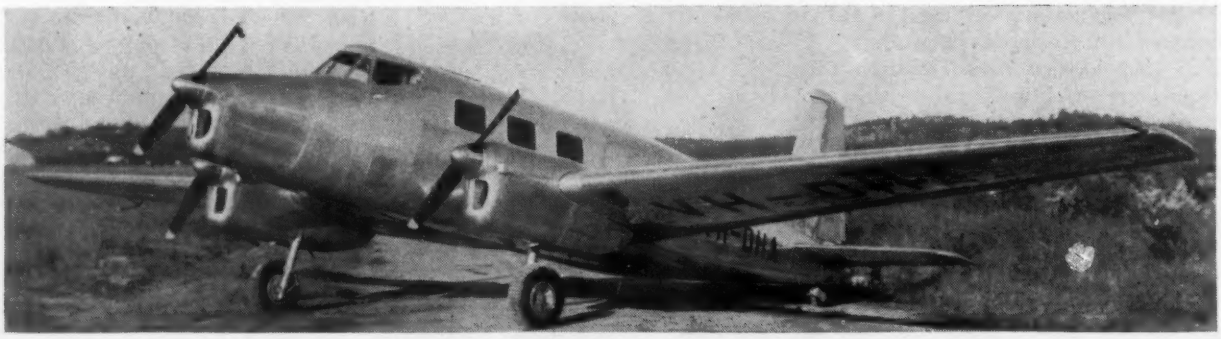
Sale of six model 47-D helicopters to the Argentine Navy has been announced by Bell Aircraft Corp. This brings to 17 the number of helicopters which Bell has sold in Argentina.

David G. Forman, manager of the company's helicopter division, said he expected this would be the first of several similar sales in South and Central American countries. Forman recently returned to the United States from an extended tour of South America, during which he conferred with government and commercial officials about helicopter purchases.

"The work which eleven of our helicopters have performed in Argentina, fighting the locust plagues which annually do damage totaling many millions of dollars is being watched with great interest by other Latin-American countries," Forman said. "Users of our helicopters in Argentina are doing excellent work in agricultural operations particularly, and the Argentine government has followed this progress, noting the success recorded."

Wolfe Leaving PAA

Thomas Wolfe, widely known aviation figure, is resigning as vice president in charge of Pan American Airways' Pacific-Alaska division April 1 to establish his own business. Wolfe joined PAA in 1946. Before that he was vice president of Western Air Lines for 10 years and was with United Air Lines 9 years.



AUSTRALIAN BUSH FEEDER FLIES

De Havilland Drover, tri-engine transport has completed its first test flights. The three-ton feederliner is powered by three 145 hp. D.H. Gypsy Major X aircooled engines and cruises at 135 mph. It has a 500-mile range and a one-ton useful load. Landing gear is fixed. The Drover is designed to replace the venerable D.H. Dragon Rapide, which also has one-ton useful load and 135 mph. cruising speed and additional 50-mile range on only two engines. (World News Photo)

Salt Lake Airport Plan

A $5,000,000 master plan for 10-20 year development of Salt Lake City's municipal airport has been submitted to CAA for study and approval. Proposed improvements, to involve Federal financing: One 8700 ft. instrument runway and taxi strips, $1,200,000; extension of existing north-south runway to 8700 ft. and extension of diagonal runway to 7000 ft., $1,500,000 to $2,000,000; and erection of new administration building and hangars costing $1,500,000 to $2,000,000. Hangar facilities for 300 personal aircraft are contemplated.

George Gay Dies

George Gay, pioneer aviator and chief of CAB's Safety Bureau in the New York region, died recently at the age of 56. A personal friend of the Wright brothers, Gay became a pilot in 1910. He served with the Army Air Corps in World War I and with the Navy during World War II.

Altschul to Speak

Selig Altschul, financial commentator for AVIATION WEEK and aviation consultant, will address the New York Society of Security Analysts at a luncheon meeting March 9 on "The Dynamic Aviation Scene." Altschul was financial consultant on aircraft industries to the Congressional Air Policy Board.

AVIATION CALENDAR

Mar. 8—ICAO maps and charts division Brussels.
Mar. 8-9—Iowa state airport management conference, University campus, Iowa City.
Mar. 12—AIA airworthiness requirements technical committee, western division meeting, AIA Office, Hollywood, Calif.
Mar. 18-19—California State Aviation Conference, Hollywood Rosevelt Hotel, Hollywood.
Mar. 19—National flight propulsion meeting, Institute of the Aeronautical Sciences, Hotel Carter, Cleveland.
Mar. 22—ICAO aeronautical maps and charts division, Brussels.
Mar. 28-31—Annual conference, Society of the Plastics Industry, Santa Barbara, Calif.
Mar. 30—ICAO personnel licensing division, Montreal.
Mar. 30-Apr. 1—Air Transport Association engineering and maintenance conference, Continental Hotel, Kansas City.
Mar. 31—Society of Automotive Engineers, metropolitan section, aeronautic panel meeting on Cabin Supercharging for Fighter Aircraft, New York City.
Apr. 1-3—American Institute of Electrical Engineers, Des Moines.
Apr. 4-8—American Association of Airport Executives, Congress Hotel, Chicago.
Apr. 17-24—Northwest aviation exposition, Minneapolis auditorium, Minneapolis.
Apr. 20—ICAO rules of the air and air traffic control division, Montreal.
Apr. 22-23—AIA personal aircraft council meeting, Dallas.
Apr. 22-24—Fourth annual forum, American Helicopter Society, Philadelphia.

INDUSTRY OBSERVER

► **Air Force plans for a transcontinental record-breaking Los Angeles-Washington flight attempt by the 500 mph. Northrop YB-49 were cancelled last week with indefinite postponement. Air Force feels that the airplane and flight crew have had insufficient flight time for such a gruelling test of both. The flight is calculated at less than four and one-half hours, which would clip 47 minutes from the present 5 hr. 17 min. record held by the Douglas XB-42 Mixmaster propeller-driven bomber. This record was set Dec. 8, 1945 by Capt. G. W. Edwards and Lt. H. F. Warder of the Air Force.**

► Curtiss-Wright XP-87 all-weather fighter made its first test flight last week at Muroc Air Force Base, Calif., after a three-week delay by mud. The 15 ton fighter stayed aloft for nearly an hour with Lee Miller, C-W Manager of Flight Operations, at the controls. Robert Park, flight engineer, served as copilot and observer. One of the largest fighter planes ever built (only Northrop P-61 and Lockheed XP-58 were heavier), the XP-87 has a 60 ft. span, 65 ft. length and 20 ft. height.

► **Boeing Airplane Co. is conducting tests with various sizes of ram jet engines in a separate research facility at Renton, Wash., under a program for the USAF. High pressure steam is obtained from an adjacent power plant of the Puget Sound Power & Light Co. Because of the critical power shortage in the Pacific Northwest, the Boeing research facility is able to obtain steam only at off-peak periods. Steam is piped to a modified G.E. I-40 turbo jet engine which supplies high velocity air for supersonic studies on large-diameter ram jet engines in a "thermodynamic" wind tunnel, according to Dan Hage, propulsion unit chief.**

► Glenn L. Martin has formulated definite plans to enter the helicopter field, possibly early next year. Design work on a new project, headed by Agnew E. Larsen, is well advanced with detailed engineering scheduled shortly.

► **Northrop Aircraft, Inc. has disposed of the operating business and assets of its subsidiary Salsbury Motors, Inc. The sale was made to Brown-Bevis Equipment Co. for a reported $500,000. Salsbury designs and manufactures small gasoline motors and a light motor scooter. Northrop lost more than a million dollars on the Salsbury project.**

► Lockheed P-80 jet fighters of the 94th Fighter Squadron, First Fighter Group, on training exercises in Alaska are modified to permit engine starting with gasoline after which combustion is shifted to kerosene. Modification consists of external fitting for gasoline supply.

► **Kellett XR-10 twin engine helicopter is completing its final month of a nine-month test program at the Kellett, Upper Darby, Pa. plant. Air Force acceptance flights are planned to begin in April. Production plans are still uncertain.**

► Joint Air Force-Army evaluation team is now on tour of U. S. helicopter manufacturers to evaluate current commercial helicopters for possible Army use. Lieut. Col. D. W. Graham, chief special aircraft branch, Wright Field, heads the team. There are no new military production helicopter contracts in the offing.

► **Vickers Supermarine Attacker, a Nene-powered jet fighter, set a new record for a 100 kilometer closed course with a 564.81 mph. performance. Old record of 549.2 mph. was set by RAF Gloster Meteor Mark IV.**

► Westinghouse 24C jet engine has passed its 150 hour Navy qualification test. Two 24C engines have finished 200 hours of wind tunnel testing under conditions simulating high altitude operation, severe icing and afterburning.

► **North American FJ-1 Navy jet fighter plane is being groomed for West-East speed record attempt. Warm-up inter-city flights are being continued to measure fuel consumption and develop cruise control data. Latest performance is a one hour, 58 minute, 7 second record-breaking flight from Seattle to Los Angeles at an average speed of about 550 mph. The flight was officially timed by NAA officials and replaces a 1946 record set by a Lockheed P-80 Air Force jet fighter. Piloted by Comdr. E. P. Aurand, the FJ-1 was one of three that left Seattle on record-breaking hops. The other two ran into headwinds that balked Seattle-San Francisco and Seattle-San Diego records.**

► Royal Aeronautical Establishment at Farnborough, England reports that a Spitfire has flown at Mach 0.92 under full control. This was a true air speed of 620 mph. at 30,000 ft.

RESEARCH LEADER

Dr. William F. Durand, one of the nation's outstanding aeronautical research leaders, was awarded the Medal For Merit in a presentation at Ames Aeronautical Laboratory, Moffett Field, Calif., by Gen. Carl Spaatz, Chief of Staff, U. S. Air Force. Dr. Durand was an original member of National Advisory Committee for Aeronautics when agency was created in 1915, and became NACA's first civilian chairman. He fathered development of Ames Laboratory.

USAF Will Buy 23 Northrop Pioneers

Air Force will award a contract for 23 Pioneer transports to Northrop Aircraft Inc., assuring a production future for the design. Prototype was destroyed recently in a crash at Los Angeles.

Loss of the prototype cost the life of Northrop test pilot L. A. Perrett, who stayed with the craft after two other crew members parachuted to safety. Structural failure of experimental dorsal fin occurred as the plane was undergoing maximum side load flight tests.

▶ **Tail Problems**—The Pioneer was undergoing modifications of the empennage. Flight tests aimed at solution of minor excesses in hinge moments on the rudder and elevators. A spring tab system was installed and the dorsal fin had been fitted in the hopes of linearizing rudder pedal forces at large angles of rudder deflection and airplane yaw.

The dorsal fin was designed to prevent rudder reversal in these attitudes and reduce maximum pedal forces by producing in them an orderly increase with angle of rudder deflection.

▶ **10,000-lb. Load**—The 25,000-lb. transport carries a 10,000-lb. useful load and has demonstrated its ability to land and take off in approximately 500 ft. at design gross weight. The design attracted wide interest for use in rough country, but only commercial commitment has been from TACA, which plans to buy 40 Pioneers if CAB approves the purchase of the airline by Waterman Steamship Co. Production for the Air Force may permit a price reduction to civilian customers.

LETTERS

A Fixed Baser Speaks

To the Editor:

If I had to be 100 percent on the side of Capt. Balfour or UPMA I am sure I would join with the former. Perhaps Balfour is a little over-enthusiastic but he is on the right track.

I have started operations only since the war. My acquaintances among CAA inspectors are not numerous. For those I have met, I have nothing but the highest regard. I feel that as a group of government employees they are exceptionally unusual. . . . I dare say that all inspectors are not of the type I have been fortunate enough to meet. For this reason perhaps the file that UPMA, of which a am a member, desires to institute is a good step. It should not be considered lightly, however, and the greatest of weight should be given to the source from which complaints are received and the frequency with which they occur.

JOHN C. VAN ARSDALE, Manager
Cape Cod Flying Service
Marstons Mills, Mass.

Remove the Stall Hazard

To the Editor:

Your editorial, "Wake Up! Banish Stalls," of Nov. 10, levels a fair and timely charge against an all too large reactionary element in the industry. But no stall warning, physical or indicative, will banish the stall. Stall warning, by buffeting or visual-aural devices, is a must for many existing airplanes, but will not entirely eliminate stall-spin accidents. Such accidents will be eliminated only when the hazard due to stalls is removed. In some personal airplanes it has been; in all it can be.

There are but two kinds of airplanes—safe airplanes and airplanes which become something else when stalled. As a light airplane designer who has produced several of each kind, I have learned that it is easier to remove the stall hazard than to get free spin recovery with a ship having accident-prone stall characteristics.

A safe-stalling airplane is one which, when apparently stalled, this happens: nothing. The cost of such characteristics is: nothing. This statement is over simplified, but true.

Every personal plane manufacturer should ask himself this: In any useful attitude and condition of flight with any appropriate power, including final approach, 45 degrees banked turns and 10 to 1 climb slopes, will my airplane, when stalled with full elevator, maintain lateral control? Will it stay substantially on course or in the initial turn attitude? Will the ailerons always overpower the rudder? For any such stall in non-gusty conditions and with power cut, can a landing be effected, from any altitude?

If his answer is yes, his airplane has the necessary stability and control at the apparent stall to be called a safe-stalling airplane. Rolling, yawing and pitching oscillations may be slight and, if divergent, at a rate slow enough to make leisurely corrections. With controls held back, it will mush level to a successful landing from any altitude too low for recovery and normal landing flare. Gear capacity must, of course, be adequate. Whether or not the ship can be forced to spin is relatively unimportant, since an unintentional spin is practically impossible.

These are not government requirements. These are ethical requirements. A number of personal planes have all or most of these characteristics; Ercoupe, Stinson, Bellanca, Throp, and a few others. . . .

What does it cost? Is not a lot of lift thrown away by strips and twist to get lateral stability at the stall?

If an airplane does not have safe stalling characteristics, all operations should be conducted at speeds 30 percent above stalling speed (CAR 03.122 and 03.124). This means only 60 percent of maximum lift is used. A safe stalling airplane can be safely operated at 10 percent above power-off stalling speed, or 83 percent maximum lift. The difference of 23 percent potential lift is much more than required to "keep the outer half of the wing flying." Actually, no lift sacrifice is necessary (i.e., wing may be designed for constant lift distribution) if slots or a hooked nose is used on the outer wing half to delay stalling. When properly designed, drag increase will be negligible.

Can a ship have flaps or much c.g. travel and still properly limit elevator travel so as to stall only the center portion of the wing?

Some safe-stalling types have over 15 percent c.g. travel. Elevator stops or stabilizer setting can easily be coordinated with flap setting. Sufficient longitudinal stability (static margin) must be provided so that elevator power is not overly sensitive at most rearward center of gravity. . . .

"Safe-stalling provisions cost too much to build," I was told by the chief engineer of a large light airplane company.

The easiest answer to this is, "Keep your customers and your customers will keep you."

A stall-warning device is very much in order and perhaps should be made mandatory for those manufacturers who have done nothing to eliminate the stall hazard. They either have a "good enough for me" philosophy or have not learned that a small budgeted engineering department is their most expensive operation.

CAB and CAA should do these things immediately:

1. Discourage spins and snap rolls in training programs.

2. Publish an analysis of stall-spin accident frequency for types having various stall characteristics. Type identification should be made available to manufacturers who know more about competitors' flight characteristics than the accident accident analysis section can categorize.

3. Recognize the superiority of safe-stalling airplanes. Certificated take-off and landing distance are now determined by rules that nearly always give the same results regardless of stall characteristics. . . .

AVIATION WEEK is to be commended. The stall-spin accident situation is a dark, deep and deathly hole over which you have hung a light. Let's not only build a fence around it; let's fill it up.

FRANK B. JOHNSON
2045 Rose St.
Burbank, Calif.

FINANCIAL

CAB Still Seeking Best Method For Determination of Mail Pay

Northeast, National decisions emphasize need for uniform and direct formula; other awards analyzed for indication of future trend.

The complexities of mail rate determinations again were highlighted by two recent significant decisions by the Civil Aeronautics Board, whose awards to National and Northeast appear to have followed different patterns.

National applied for a rate equivalent to about 30 cents per plane mile, premised on a rate of 60 cents per ton mile to be paid on a minimum capacity factor of 1,000 lb. Instead, the Board based its award on a minimum capacity factor of 450 lb. per plane mile for the period from July 14 to Dec. 31, 1947. For the year 1948, this rate will be reduced through a drop in the minimum to 350 lb. per ton mile. After Jan. 1, 1949, a further reduction is contemplated with the minimum set at 250 lb.

The rate applied to the 1947 period amounts to a total mail award of $445,000 and is only about $225,000 more than the amount actually received. The 1948 rate is equivalent to about $1.80 per ton mile or about three times the straight 60 cents a ton mile previously received.

▶**Little Concern for Grounding**—Presumably little consideration has been given the company's losses due to the grounding of the DC-6s and the pilot strike. The Board action was in the form of a show cause order and National may contest the decision in seeking further mail compensation.

In the Northeast case, the Board awarded total mail compensation of $2,107,578 to the carrier for the period May 1, 1945, to April 30, 1947. This is estimated at only about $600,000 in excess of the amount previously paid. The current award follows an increase granted March 18, 1947, which added approximately $104,000 to 1945 revenues and about $470,000 to 1946 mail compensation.

Northeast had been receiving mail compensation of 25 cents per plane mile. The award just granted brought the mail pay to an average of 29.3 cents per plane mile. Northeast requested 30.03 and 42.05 cents per plane mile, respectively, for the two years involved.

The CAB was very critical of Northeast's operations and reserved for further consideration the award to be made for the period after May 1, 1947.

▶**Maintenance Queried**—For example, the Board questioned the maintenance costs of Northeast's DC-3s, which averaged about $41.34 per airborne hour flown. The comparable average of other operators was only $29.93. Yet, the Board allowed Northeast a cost of $32.75, about 30 percent over the average. Presumably this was to permit the carrier to show a 7 percent return on the investment after all taxes.

There were other points of criticism in Northeast's previous operations. Among other things, the Board poses the question why the carrier's mail pay requirements in its second year of Boston-New York service should be three times higher than prior to the inauguration of this operation. It may be recalled that when Northeast applied for this route it maintained that with this addition its operations would become more self-sufficient and its dependence upon the government in mail revenues would be decreased.

In all fairness, however, it should be pointed out that the period under review and criticized by the Board preceded election of a new president who is believed to have brought a new point of view to Northeast's operations.

▶**Rate Hits High**—The rate awarded Northeast is equivalent to about $18.90 a ton mile, the highest on this basis in the domestic trunk line category.

These two mail pay decisions develop considerable conjecture as to the ultimate disposition of other pending applications for higher mail pay. With the exception of American Airlines, every U. S. carrier has either received or applied for higher mail compensation.

While temporary rate increases have been awarded to Chicago & Southern, Colonial PCA and Western, these carriers are awaiting permanent rate determinations.

Of considerable interest is the Board's decision on its mail rate awards to be made to those carriers in the 45 cents a ton mile "compensatory service" class. This group includes United, TWA and Eastern which have all applied for relief and American which has not. All of these carriers have differing financial and operating problems at the moment. Yet, it is difficult to have a rate established for one and not applied to all four.

In this manner, American probably will gain by any general increase in the mail compensation level without actually having been an applicant. However, American may forego any retroactive increase in mail revenues from the date of filing, a condition which obtains for the other carriers in this instance.

▶**Previous Decisions Recalled**—In the constant pressure for higher mail pay and criticism leveled at the CAB for its attitude in making its awards, it is particularly noteworthy to recall a decision in recent months which went by virtually unnoticed.

This was the mail pay award to Continental Air Lines on Dec. 19, 1947. After various preliminary procedures, the Board on Nov. 7, 1947, issued a statement of tentative findings and conclusions as to a fair and reasonable mail rate for Continental. With virtually no palaver, Continental did not object to the proposed rate and subsequently, on Dec. 19, 1947, it was declared effective on and after Dec. 1, 1946, date of the original application.

▶**No Airtight Formula**—The determination of mail rates has never been an easy task. Despite the various criticisms pointed at the CAB in this matter, no infallible formula has been presented.

The President's Air Policy Commission recommended that the "Board act quickly in determining air mail rates but that it grant enough mail pay to keep all the lines in business to the extent required by the public interest, provided their difficulties are not due to dishonest, uneconomical or inefficient management." This is a commendable recommendation and there can be no quarrel with it. However, it is virtually the same mandate laid down in the Civil Aeronautics Act of 1938. After discussing the various elements comprising airline costs to be used as yardsticks the commission recommended, "that the Board give this problem further study and investigation."

The Congressional Aviation Policy Board, in its recommendations, was not much more helpful in this direction.

▶**Opportunity Not Used**—Here were unusual opportunities for outstanding aviation agencies who considered the best thinking on the subject to come up with the answer, but they failed to do so.

It is small wonder that CAB has not yet solved mail compensation awards to everyone's satisfaction. **—Selig Altschul**

ENGINEERING & PRODUCTION

Ryan Designing New Navy Plane

Pending outcome of engineering project, present work holds hopes of profit.

Addition of Ryan Aeronautical Co. to the list of manufacturers with military "dream" planes now is disclosed.

Ryan's role is under Navy sponsorship, and covers the production of an engineering design for an airplane project guardedly described in the company's annual report as being "of very advanced nature".

Navy's past relationship with Ryan resulted in production of the Fireball combination fighter (reciprocating engine and jet), and more recently a single-place experimental plane, the XF2R-1, using a turboprop nose powerplant plus a gas turbine engine.

The engineering design contract, however, cannot be considered at this time as indicative of an immediate production order.

▶ **Present Work**—Currently Ryan is basing 1948 production activity upon manufacture and sale of the Navion personal airplane, stainless steel exhaust systems, jet engine parts and accessories, and guided missile development involving considerable manufacturing volume.

The company's report shows a strong inclination to emphasize Navion production, and a comparison of total current assets of $3,958,410 as of Oct. 31, 1947 with $848,109 of liabilities of that date indicates an adequate working capital in support of the enterprise.

Ryan's personal airplane position may be considered secure in that the company has followed a practice of currently writing off initial costs of the project, and is committed to gearing production to actual sales. At this time production is at the rate of two planes per working day, which may be expected to increase as domestic sales are extended to include foreign distribution now under development in Argentina, Belgium, Canada, France, India, Mexico, South Africa, Venezuela and Uruguay.

▶ **1947 Loss**—Ryan's net loss of $127,659 for 1947, on sales of $8,015,766, can be attributed to the company's unsuccessful attempt to diversify and enter a non-aviation market in the production of stainless steel caskets. The project finally was sold to a Boyertown, Pa., casket company after a loss of $660,774.

At the close of the 1947 fiscal year Ryan's net assets amounted to $3,110,301, or $7.74 per net outstanding share of stock, and after payment of all bank loans cash on hand amounted to $383,082. Buildings, equipment and other fixed assets, originally costing $2,374,859, showed a net depreciated value of $622,541.

Ryan's announcement of a 10-cent-per-share dividend payable this month to stockholders of record Feb. 20 is indicative of continuation of a policy of making dividends payable on an annual basis shortly after ending of the fiscal year.

UAL May Decide Soon On Convair-Liners

United Air Lines interest in the Convair-Liner apparently has revived and should bring a quick decision, to buy or not to buy.

If UAL buys, it may do so with the biggest individual order to Convair outside of American's which originally called for 100 planes and recently was cut back to 75. Pan American's order for 20 is the second largest Convair-Liner order to date.

Further indication that UAL is in a mood to talk business, after nearly six months of playing hard-to-get, is a recent visit to Convair headquarters at San Diego by a United executive group headed by J. A. Herlihy, executive vice president.

Last fall UAL sent an engineering team to San Diego to analyze the Convair-Liner. Subsequent reports were that UAL would not be interested in the transport, but Convair-Liner salesmen showed little serious concern. They expressed belief that with the pressurized Martin 3-0-3 out of the picture UAL eventually must reconsider if it desired two-engine replacements for its obsolescent DC-3s.

Lycoming to Produce Engines for Buses

Taking up the slack caused by the decline in lightplane demand, Lycoming engine division of Avco Manufacturing Corp. has expanded its operation to the motor coach field, it is disclosed in the parent firm's annual report.

Lycoming will manufacture engines for Hall-Scott buses, produced by another Avco subsidiary.

The division is making every effort to secure outside contract business for production of machine parts suitable to present facilities. Additional revenue is assured by a contract to make parts for Packard built Rolls Royce engines for the Air Force.

It is anticipated that a forthcoming Navy contract for Fairchild XNQ-1 trainers will result in substantial orders for Lycoming R-680 powerplants, and further orders are expected for SO-580s which will power the Beech Twin-Quad.

Lycoming has taken over production and contracts formerly handled by the Republic Aircraft Products division, which is being consolidated with Lycoming due to lessened demand for aircraft engines.

The division has recently been awarded a contract to survey and analyze starters for jet engines. Studies are also being conducted on the application of air-cooled engines in industrial work since this type of power offers weight saving, elimination of coolant, and lower installation costs.

1947 Production

Latest figures place the number of aircraft produced in December, 1947, at 790, rather than the 780 shown in the table on page 22 of the Feb. 23 "Inventory of Air Power" issue of AVIATION WEEK. The new total brings 1947 production to 17,718 planes.

Additional data on the total value of production for the months of January, June and December, 1947, has increased the estimated value of all production for the year from $905,821,726 to $1,066,973,651. (An AVIATION WEEK forecast Sept. 1, 1947, predicted that 1947 revenue would be $1,158,432,498.) The revised figures on total value for the three months are: January, $80,723,693; June, $123,821,842; and December, $99,592,369.

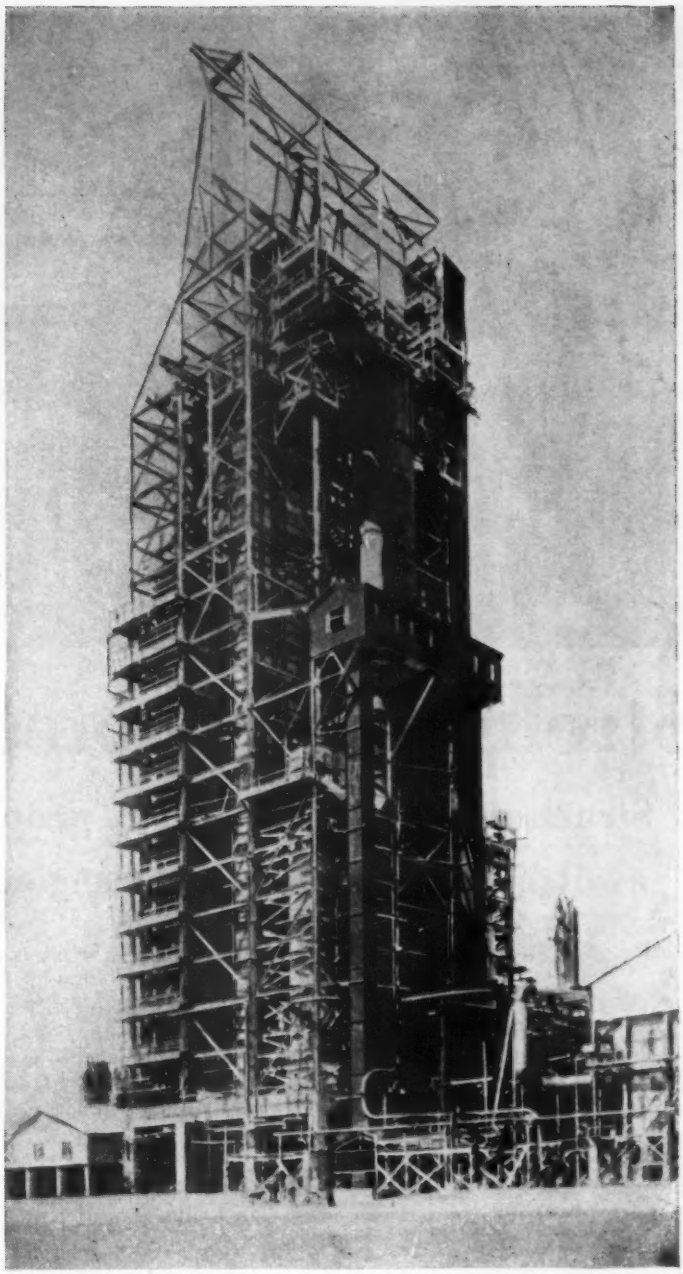
Propeller Production

Production of Hamilton Standard Propellers' hollow-steel blade rose to a new high during the last half of 1947, and during one month exceeded production of duraluminum blades, the company announces.

Hollow-steel blades are now in use on Martin 202s and Eastern Air Lines' Gold Plate Constellations.

Hamilton Standard claims it has worked out several new manufacturing processes in evolving the design of the blades, which comprises a shell with a central spar as its main stress-carrying member. The air spaces in the blade are filled with a hard sponge synthetic rubber to increase sectional rigidity.

PIONEERED 100 OCTANE AVIATION FUEL!—



Mobilgas
AIRCRAFT

The Flying Red Horse!

The Houdry Process of Catalytic Cracking—the revolutionary TCC Process for continuous refining—the sensational "Magic Bead" Catalyst—are three of the most important contributions in the evolution of today's super aviation gasoline.

All three are the results of *one* company's pioneering—Socony-Vacuum!

With this great background of progress, it's no wonder the aviation industry has *confidence* in the Flying Red Horse. It is now on display at more airports than any other oil company trademark!

Over 1000 important airfields—strategically located—bring quality Socony-Vacuum products always within cruising range!

Today, after 82 years' leadership in the petroleum industry, Socony-Vacuum is studying *new* developments for the future—fuels for jet propulsion and the supersonic planes to come.

SERVES EVERY BRANCH OF AMERICA'S AIR INDUSTRY!

SOCONY-VACUUM OIL COMPANY, INC., and Affiliates: MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

Strength Keynotes Liner's Design

Structure stressed to accept propjet power when commercially available. Transport shows engineering gains, airline planning.

By SCHOLER BANGS

Now that the Convair-Liner is certificated for scheduled operation, a thorough look at Consolidated Vultee Aircraft Corp.'s new transport is in order.

Some of its structural components would seem to exceed requirements of the plane's present weight-speed specifications of 39,500 lb. and 300 mph. true airspeed cruise at 16,000 ft., using 1200 hp. per engine.

▶ **Structure Potential**—Frank Fink, Convair's San Diego Division chief engineer, and G. G. Green, chief structures engineer, support this observation. Says Fink: "Intentionally, we engineered the Convair-Liner for a design level-flight cruising speed considerably higher than the 300-mph. true airspeed currently specified.

"The airplane's structure will permit us to go up to an indicated level flight speed of 280 mph., or in excess of 360 mph. true airspeed at 16,000 ft. with the gross at 39,500 lb.

"At the outset we anticipated a succession of gains in available power, as engines improved, and accordingly made ample allowance for growth of the airplane in original stress calculations."

Considering what can be expected of power advances in piston engines having weight comparable to that of the Convair-Liner's P&W R 2800CA-18 power plants, Green feels that the transport will accept, without serious modification, a reciprocating engine delivering up to 3300 hp. For this 30-percent increase in power, the transport should show a 15-percent gain in cruising speed at altitude, or a true airspeed of 345 mph.

Expressions of these engineers, who have been with the Convair-Liner project since its inception, probably should be viewed as conservative in the light of an even stronger declaration made by William A. Blees, Convair's vice-president in charge of sales:

"The Convair-Liner was designed to a strength that, without having to rebuild the airplane, we can convert it into a jet transport when practical power plants become available.

His estimate is more than a salesman's enthusiasm, for in early development of the Convair-Liner, serious engineering studies were made of performance and flying costs with (1) more powerful reciprocating engines; (2) two TG-100 propeller-jet power plants; and, (3) two inboard reciprocating engines plus two 19-in.-dia. Westinghouse turbojet engines mounted at the extremity of strengthened outer wing panels.

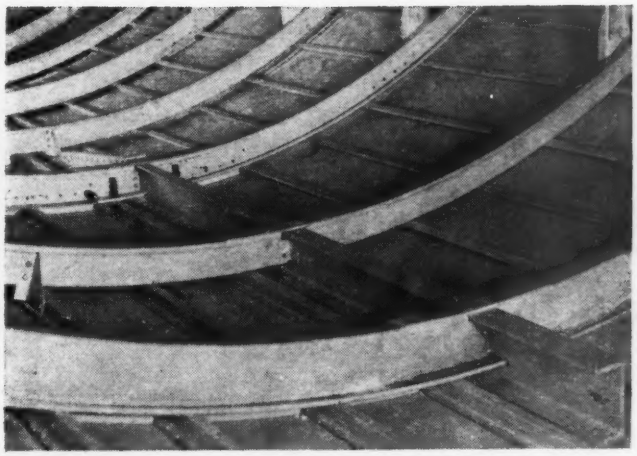
▶ **Wing-to-Fuselage Tie**—While the airplane presents a configuration that is, at first glance, conventional, a study of the structure reveals originality at many points.

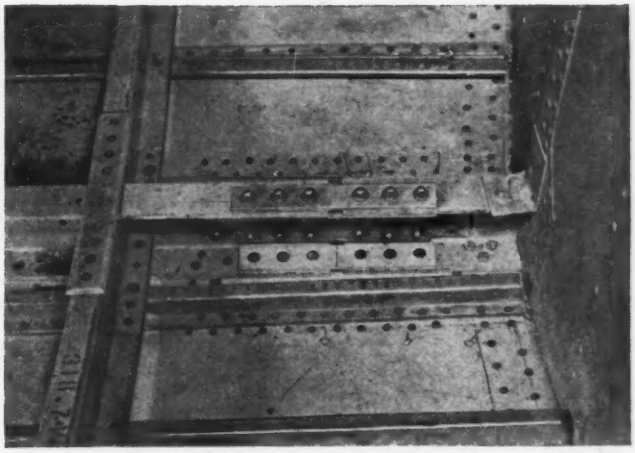
Tie-in of wing to fuselage, for instance, is distinctive in that in addition to the attachment of fuselage to the wing through four forgings (connecting to two heavy fuselage frames and receiving wing bolts at junctions with the upper side of front and rear wing spars), the wing is made integral with a strong keel extending fore and aft in the fuselage belly.

The keel is an extruded 75ST channel longeron, turned upon its side, and divided into three sections. The midsection is built into the bottom of the wing center section during wing fabrication. Extremity sections of the keel, each extending along the fuselage bottom for approximately 80 in., or a four-frame distance, are made secure in their respective positions during fuselage fabrication. In the mating of wing to fuselage, the wing-fuselage keel ends are spliced with stainless steel rivets.

The effect of this additional tie-in of wing to fuselage with a keel member is to increase the effective structural depth of the fuselage by approximately two feet, or 27 percent. The result is a worth-while reduction of fuselage weight.

Allowance of a lighter fuselage structure has permitted avoidance of 75ST skin on the body and attendant problems of hot dimpling for the use of flush rivets. The fuselage skin is 24S Alclad, largely .025 gage and stiffened





Extruded channel longeron, serving as "keel," helps tie wing to fuselage and distribute stresses. Left: Longeron in fuselage bottom, extending forward from wing. Right: Junction of forward longeron with similar longeron member extending through the front spar.

by the application of light stringers.

► **Skin Details**—The fuselage skin is in sharp contrast with the use of a heavy 75ST skin for the wing.

In the Convair-Liner wing, the structure departs from the conventional in that relatively light spars are used and are subjected to shear loads only. Main bending loads are taken by a heavy skin-stringer structure. In areas of greatest load between front and rear spars the skin is .081 in top and bottom panels. Thickness of skin beyond areas of principal stress reduces to .051 and .032.

While Convair engineers feel that wing skin thickness is considerably above that dictated by loads to which the present model Liner will be subjected, this feature presents several advantages. The heavy skin gage minimizes the problem of insuring fuel-tight installation of flush rivets since the head height of the largest rivet used is substantially less than .081 in. The relatively greater flexural stiffness of the heavier skin is also a factor in avoiding trouble in the sealing of the integral fuel tanks. In addition, it insures torsional stiffness of the wing, and precludes skin buckling and distortion of the wing's aerodynamic characteristics under heavy loads.

Exceptional strengthening of wing skin is gained by attachment, parallel to wing span, of extruded 75ST "Z" stringers. These are spaced at 5-in. intervals.

In discussing the wing structure, Fink said: "We consider that we have been the chief promoters of thick skin gages, numerous stringers, and small spar caps as a means of obtaining greatest effective use of materials."

► **Door Problems**—A serious problem was presented in designing the transport for pressurization and at the same time retaining large door areas desired by various customers.

Distribution of fuselage stresses around the 7-ft.-high door required by American Airlines for its main passenger entrance, and the longer underfuselage combination door and stair specified by Western Air Lines, called for original thought.

The doors themselves finally were made to do the work of carrying hoop tension loads by the simple expedient of heavy hinge attachment to a 75ST longeron at the top of the door cutout area, and at the bottom by securing the door to the fuselage with strong hook latches. This applies to the American Airlines door, which swings outward and up from a top hinge point. In the Western model the door is secured along its length by hook latches which transmit hoop loads through the door structure.

► **Landing Gear Design**—Considerable interest has been expressed concerning the apparent small size of the Convair-Liner landing gear. Compared with landing gears on other aircraft it may be cited as an assembly of relatively short structural members and small wheels. However, specifications of the transport show that despite its short-legged gear, propeller ground clearance is adequate; 12 in. in the case of models using the 13-ft. 1-in. Hamilton Standard propeller.

Extreme interest attends attachment of the landing gear to the wing. Fittings are such that, theoretically, in a crash landing, the main gear will be wiped clear of the airplane without destruction of wing spars or rupture of integral fuel tanks.

Since the inboard bulkhead of the integral tank terminates at the engine nacelle area, conventional engineering practice would have dictated the use of this strong, rigid member as a mounting

Two years ago Consolidated Vultee Aircraft Corp. prepared the following tabulation, not previously published, which showed possible conversion of the Convair-Liner (Convair 240) as a jet transport. It was a research study for weight conditions subsequently changed, and does not represent company planning today for future model changes. It is interesting in showing a new transport design initially stressed to accept greater power as new engines might prove practical.

CONVAIR 240—COMPARISON OF POWER PLANTS

(Based on 500-mi. range plus ATA reserve 200 mi. plus ¾ hr. with 10-mph. headwind)

Power Plant	Two R 2800CA-17	Two 3250C18A	Two R 4360C-12	Two TG-100 Turbines (Propjet)	Two R 2800CA-17 & two wing tip 19-in. Westinghouse jets.
(Takeoff Hp.)	2,400	3,200	3,800	2,440	2,400 plus 1,600 lb. static thrust
Gross Weight	39,000	39,000	39,000	39,000	39,000
Weight Empty	22,840	24,400	28,700	22,200	24,700
Payload	11,500	9,630	4,520	9,850	7,550
T.A.S./15,000 ft.	296	317	345	353[1]	354
One Engine Out, Operating Alt., ft.	12,000	16,500	18,000	12,500	22,000
Max. Takeoff Altitude, ft.	4,000	8,000	12,000	4,500	12,000
Direct Costs					
Cents/Mi.	39.2	41.0	45.8	30.0[2]	49.0
Cents/200 Lb. Mi.	.79[3]	.85	2.03	.60[3]	1.30

[1]Due to turbine continued power output at altitude.
[2]Based upon use of kerosene.
[3]Based upon 10,000 lb. payload capacity.

1948 AIRFIELD FIRE PROTECTION

Pyrene TRADE MARK
AIRFIELD CRASH TENDER

Crash Tenders as illustrated have already been chosen for airfields at Jersey, Colombo, Basra, Brussels, Accra and Karachi.

When aircraft crash on landing—fire in its most violent form must be expected — fire that threatens and imprisons the crew and passengers—flames that can only be controlled by the application of specialised fire fighting media in the shortest possible time.

The "PYRENE" Airfield Crash Tender — a new departure in specialised fire fighting — combines mobility and tractability with an extremely high Foam and CO_2 output.

Built on a Bedford "Q.L.4." (four-wheel drive) chassis with high ground clearance which is capable of rapid movement over rough or soft ground. It carries 40 gallons of "PYRENE" Foam Compound and 500 gallons of water which, through the medium of "PYRENE" Mechanical Foam Generators, produce 2,500 gallons of foam per minute for approximately 1 1/3rd minutes. In addition, this vehicle is fitted with 6-50 lb. CO_2 gas cylinders connected through a manifold to two hose reels, terminating in fibre gas distributors. The output is 1,600 cu. ft. of CO_2 gas per minute for approximately 1 1/3rd minutes.

This Crash Tender is designed to provide maximum visibility, ease of control and rapid action. The Coventry-Climax Fire Pump fitted within the Tender delivers 380/400 G.P.M. of water-Foam Compound solution at 150 lbs. pressure per square inch. This pump can be brought into action en route to the scene of the fire enabling Foam to be produced as soon as the hoses are run out.

Full particulars and specification will be given on application.

Write to The Sales and Service Department :-

THE PYRENE COMPANY LIMITED

9, Grosvenor Gardens, London, S.W.1. England. Cables "Pyrene London" 'Phone : Victoria 3401/2

panel for landing gear attachment fittings.

However, Convair engineers elected to attach to the unencumbered spars, inboard from the tank wall, fittings that extend downward to provide landing gear attachment points considerably below the underwing surface line.

Although no destruction tests have been conducted to prove out the theory of a wipe-off of landing gear in a crash, engineers feel that the design can be considered a true safety feature.

This probably is one of the few tests (if not the only one) not conducted to prove the airplane's structure and components.

► **Final-Stage Testing**—As a result of the DC-6 investigation, and extensive modifications ordered by the Civil Aeronautics Administration and airlines as well as by the factory, final stages of Convair-Liner testing have been rigorous. The ground and flight testing program extended well beyond the required 150 hr. of accelerated service testing, and resulted in discovery and correction of various minor discrepancies before deliveries to airlines were begun.

Particular attention was paid to the Liner's jet augmentor exhaust and heat anti-icing systems, during safety tests.

Fire tests within the engine nacelle and the long jet exhaust tube leading through the wing area were the most severe that could be devised.

Simultaneously, sparkplugs placed within the hot wing anti-icing areas were fired constantly to determine that no explosive gas mixtures were being carried into the wing and hot air ducts from the augmentor tube. Repeated tests failed to produce a fire.

In flight tests, the airplane has been subjected to maximum buffeting of hundreds of acute stalls without damage to structure or venting of the pressure-sealed cabin.

The landing gear was subjected to 20,000 cycles of raising and lowering on a ground test stand, the equivalent of more than ten years of operational use.

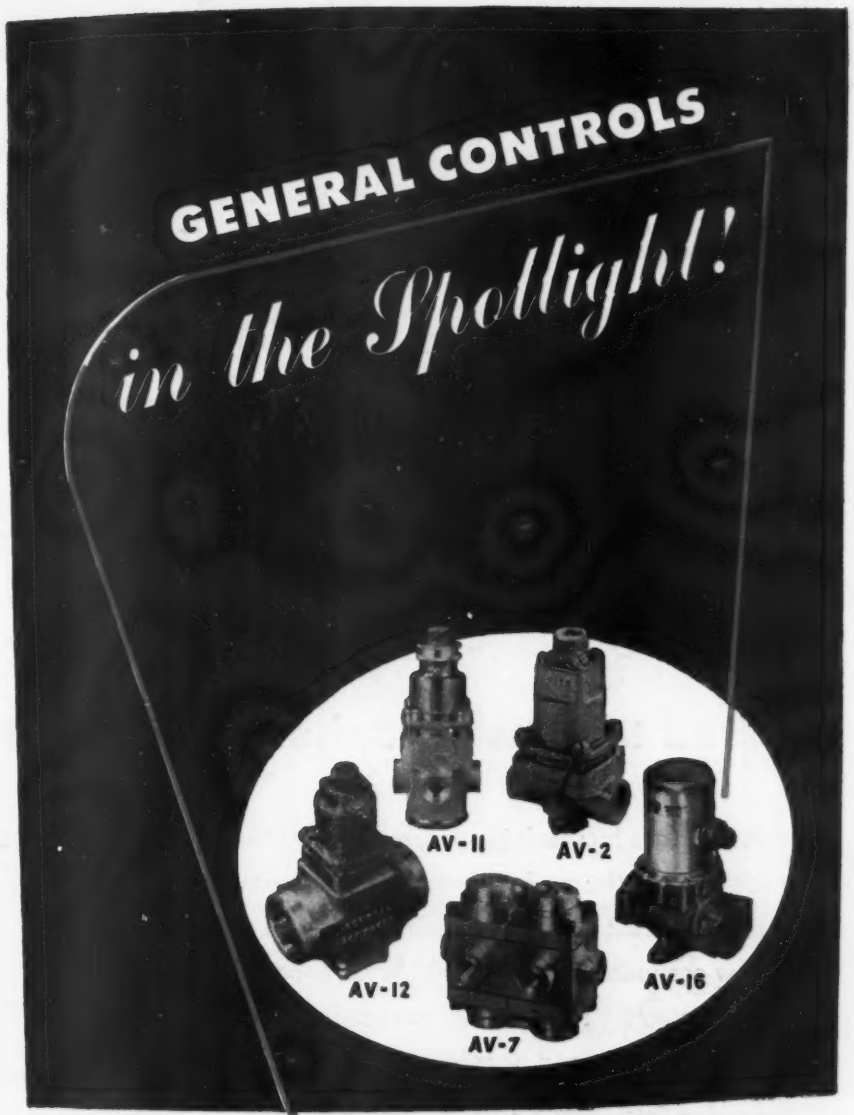
Present indications are that Convair has reached the tapering-off period of a tremendous corporate headache evolving from the company's plunge into the field of commercial transport manufacturing.

Estimate has been made that investment involved in the design and development of the transport will reach $28,000,000 before substantial income recovery begins.

One might well wonder why Convair elected to enter a field so strange to the company, and involving such risks.

Convair officers explain it this way:

Before the war ended it became apparent that military orders would be cut almost to the vanishing point upon conclusion of hostilities.



Unsurpassed *hi-g valves for aircraft**

FOR AUTOMATIC PRESSURE, TEMPERATURE AND FLOW CONTROL

*Trademark—"hi-g"—indicates positive operation in any position, regardless of vibration, change of motion, or acceleration. Automatic pressure, temperature and flow controls for every aircraft application. *Compact Size • Light Weight • Tight Shut-off* *High Flows with Low Pressure Drop • Long Life.* Outstanding performance and reliability merits recognition and acceptance. Specify General Controls with confidence. For complete specifications, request new Catalog 52C from nearest Factory Branch, or write direct to Factory.

hi-g

GENERAL CONTROLS

501 ALLAN AVENUE, GLENDALE 1, CALIF.

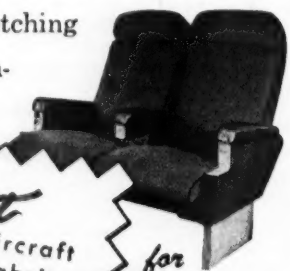
Manufacturers of Automatic, Pressure, Temperature & Flow Controls

FACTORY BRANCHES: PHILADELPHIA • ATLANTA • BOSTON • CHICAGO • DALLAS
KANSAS CITY • NEW YORK • DENVER • DETROIT • CLEVELAND • PITTSBURGH
HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES

demand the best in upholstery fabrics

Aircraft seats are increasingly subjected to more and more "landings and take-offs" as the ranks of air travelers grow. Yet upholstery fabrics must maintain their eye-appeal for every new occupant. Bridgeport Fabrics, especially designed and constructed for aircraft use, are made of the finest quality, closely woven wools and worsteds. They have a smooth, easier-to-clean surface that resists staining and scorching. It looks spic and span at the end of long cross-country hops. There are bonus qualities, too, that are especially attractive to the manufacturer or airline operator. Bridgeport Fabrics won't cling to clothing and are appealingly soft to touch. Extremely lightweight and durable, they can be supplied in exclusive colors to fit harmoniously into any interior. Special stretching and sewing characteristics speed up installation by as much as 20%.

Manufacturers and airline operators are invited to send for free samples.



Specify Bridgeport Aircraft Upholstery Fabrics ...leading manufacturers & airlines do.

for SEATS BACKS SIDEWALLS HEAD-LININGS

Bridgeport FABRICS, INC.
BRIDGEPORT 1, CONNECTICUT
Est. 1837

The only alternative to practically complete disbandment of the company's large engineering and production force was entry into commercial transport manufacturing.

Tax carry-back legislation, with its guarantee of a softening of losses that might be incurred in development of postwar aircraft, was encouraging, and proved to be an important factor in the company's decision to gamble on commercial designs.

Successively, several commercial design proposals were studied.

A four-engine passenger-cargo transport, Model 39, was flown, market tested, and abandoned as a carryback loss.

An executive transport went into preliminary design at the company's Vultee Field Division, and was abandoned after an expenditure of approximately $500,000.

In an ensuing period of engineering give-and-take, American and Convair developed from an experimental 30-passenger transport, Model 110, the basic design of the Convair-Liner. Objectionable features of the 110 were eliminated. In the lush dreaming of the period, while cash customers were being turned away from solidly filled DC-3s, the cabin was extended to seat 40. It was a blow to Convair when American insisted upon a 4-in. reduction of fuselage diameter from that of the Model 110. It meant retooling for production of the new plane. Convair had hoped that at least a portion of the new plane's fuselage could be built upon jigs already set up for the 110.

As was the case with the Model 39, Model 110 finally was consigned to the fate of tax carryback, and broken up for corporate write-off as a loss.

The rest is easily-recalled recent history—The Convair-Liner, under the now-abandoned identity of "Model 240," flew on March 16, 1947. Airline deliveries were promised for mid-summer. Strike delays, material shortages, re-design of minor and critical components all pushed the prospective delivery date into 1948.

It is true that the market is not what Convair once envisioned.

Early in the history of the project Convair estimated that a market of 1,000 units existed to be split up by those who would produce new two-engine transports. Today, two years later, the market potential appears to Convair to be closer to 700 units.

Thus far, Convair has orders, with substantial down payments, for 151 Liners. Even with a price boost, which seems certain, the company probably will have to build and sell close to 300 units to wipe out its losses and break even. Convair is hopeful, as is every other transport manufacturer, that it will win a sizeable order from the Army.

NEW "FLYING CRANE" COOLED BY FEATHER-WEIGHTS

NAVY
Test flight of the XHRP tandem helicopter, demonstrating its ability to carry a one-ton military load. It is expected to prove useful in rescues and in military river-crossing operations. Tandem rotors overcome the helicopter balance problem.

The XHRP, built by the Piasecki Helicopter Corporation in collaboration with the Navy, represents the first successful tandem rotor helicopter. Typical of the advanced engineering that went into this new ship are the FEATHER-WEIGHT all-aluminum oil coolers . . . developed in the largest, most modern wind tunnel laboratory in the aeronautical heat exchanger industry.

Inherently light, strong, compact, FEATHER-WEIGHT all-aluminum oil coolers resist the extremes of temperature, pressure, vibration and shear which frequently cause oil cooler failures. Inquiries concerning FEATHER-WEIGHT oil coolers are invited. Clifford Manufacturing Company, 561 E. First Street, Boston 27, Massachusetts. Offices in Chicago, Detroit, Los Angeles.

CLIFFORD ALL-ALUMINUM OIL COOLERS
HYDRAULICALLY-FORMED BELLOWS
HYDRON Metal

Hoppi-Copter In Second Test Phase

The Hoppi-Copter, invented by Horace T. Pentecost of Seattle, Wash., has successfully made the transition from hovering to forward flight. The first forward flight was limited, extending only some 100 ft. at a speed of approximately 18 mph., but additional flights are planned under a continuing test program on an almost-daily schedule.

No attempt has been made to exceed the 10 ft. nominal altitude used in current tests, but Mr. Pentecost believes that attainment of higher altitudes will not present serious problems.

Prior to making the first forward flight the three Pentecost machines had made many hovering flights to an altitude of 10 ft. or so, and hovered for as long as three minutes at a time. Each plane has now logged about four hours.

Since some of the hovering flights were made in winds of 18 mph. it was possible to collect much valuable data which aided in the ultimate achievement of forward flight.

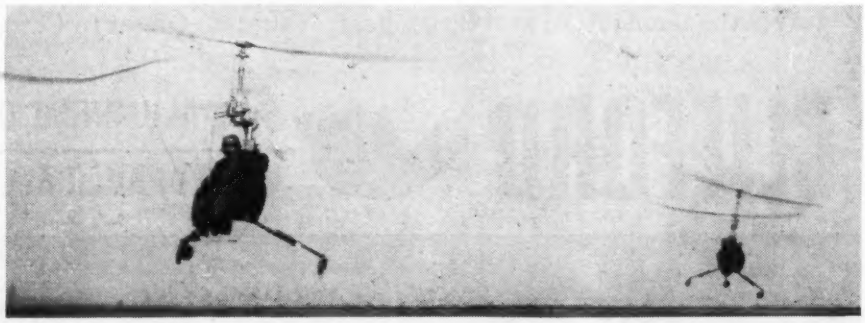
In as much as the Hoppi-Copter is designed for use at three-top height (about 50 ft.) it has not been considered necessary thus far to stress high altitude flights, however, its makers are already preparing for tests from the 5,000 and 6,000 ft. levels of Mt. Ranier to investigate flight characteristics under those atmospheric conditions.

A controversial point raised by the inventor is that the Hoppi-Copter gets no benefit from the ground cushion effect that aids the conventional helicopter. Height of the ground cushion, Pentecost says, is determined by the difference between the radius of the rotors and the height of the rotors off the ground. As the radius of the Hoppi-Copter rotors is just over eight feet, and the blades are that same distance off the ground, the machine receives no benefit from the ground cushion effect.

Another helicopter engineer states that such rule-of-thumb designation of the limits of ground cushion effect is open to debate; he is confident that certain ground cushion effects will be experienced at one blade radius; and that the cushion does not terminate at a given altitude, but diminishes to infinity. He says that in a test of one helicopter at Wright Field, the manufacturer claimed its machine could rise vertically 50 ft. under test conditions, but actually it could only attain 40 ft. Indication was that to some degree its flight was benefited by ground cushion effect.

Mr. Pentecost believes that the principal commercial use of the Hoppi-Copter will be by farmers, ranchers, and sportsmen, largely in rural and suburban areas, excessive noise would be one of the factors that would work against its use in large cities.

Hoppi-Copter Models 103 and 104, which were built simultaneously (completed just a little over a month ago), can develop up to 42 hp. but so far have not operated at over 75 percent maximum power.



Hoppi-Copter Models 103 (left) and 104 are shown here during recent hovering tests.

THERE'S A S-W FINISH FOR EVERY PLANE AND AIRPORT NEED!
The new, complete Sherwin-Williams line of aviation finishes is your best selection from every standpoint—purity, richness of color, brilliance and outstanding durability.
Each product has been carefully chosen to serve the particular needs of modern commercial and private airports. Each selected to make up a compact, efficient line—ready to do any aviation finishing job—at the highest quality level . . . at the lowest possible cost.
The pigments selected for use in Sherwin-Williams aircraft colors, for instance, are pure struck colors—free from any tinting, except where hue is lightened by addition of pure white. With Sherwin-Williams selected aviation finishes you can do the job more efficiently . . . more economically in the long run.
The Sherwin-Williams Co., Cleveland 1, Ohio (Export Division, Newark, N. J.)
Distributed by Pacific Airmotive Corporation
SHERWIN-WILLIAMS AIRCRAFT FINISHES
OPEX NITRATE DOPES
COVER THE EARTH
SHERWIN-WILLIAMS
AIRCRAFT FINISHES

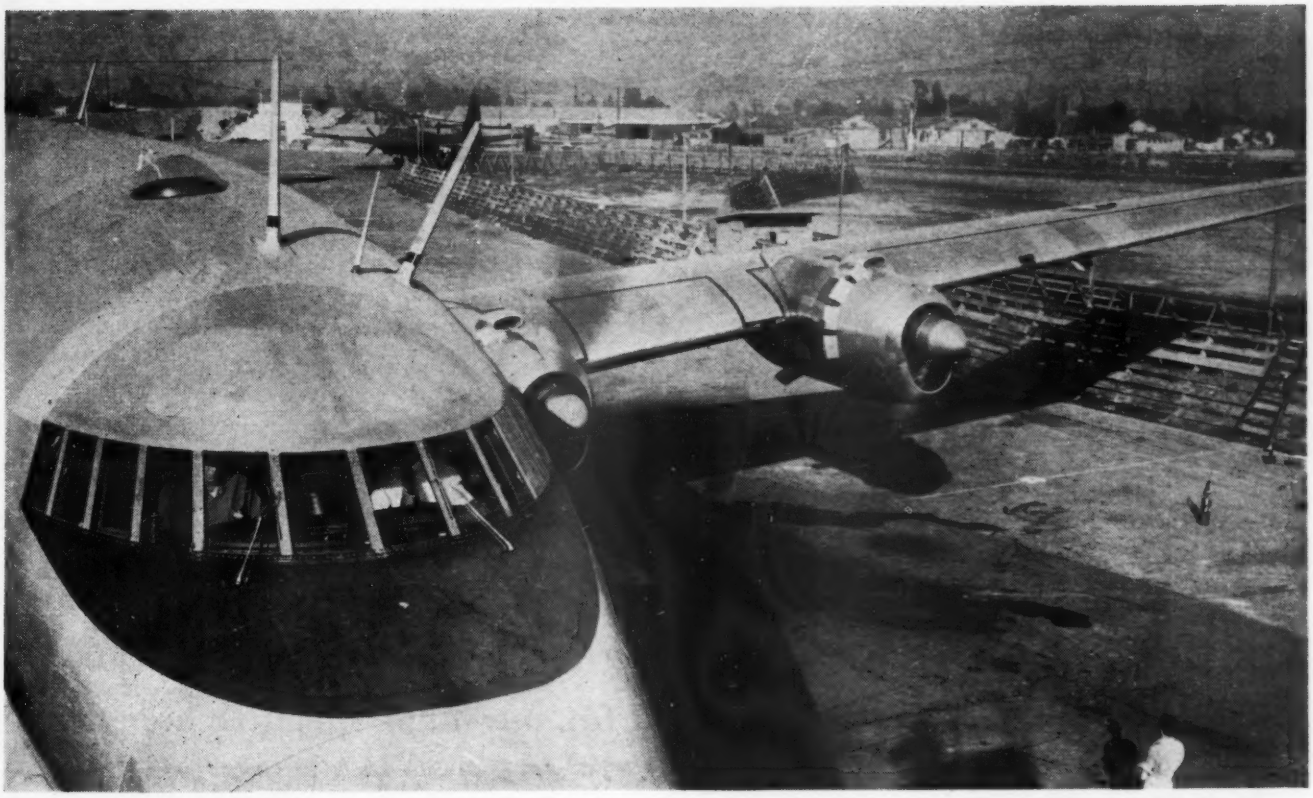
Experienced airmen would naturally expect Eclipse-Pioneer to be "out in front" on any new aviation development. And this Eclipse-Pioneer tradition is well exemplified in the research and development that has been going on in jet equipment for years. Today, as so well-proven in the past, you can expect the first and finest from Eclipse-Pioneer wherever imagination must go beyond present horizons.

Production, development, and research at Eclipse-Pioneer now includes the following jet components: *Booster coils • Gear Boxes • Complete Fuel Control Systems • Magnesyn* and Autosyn* Fuel Pressure Indicating Systems • Magnesyn and Autosyn Oil Pressure Indicating Systems • Autosyn Flowmeter Systems • Engine Starting Equipment • High-Speed Generators* • Also many others in early research stages. Detailed information available on request from responsible organizations.

*TRADE MARK REG.

Eclipse-Pioneer DIVISION OF

TETERBORO, NEW JERSEY



In Lockheed Constitution's new ducting installation, carburetor scoops have been mounted on the top of each engine nacelle.

New Ducts Give Power Increase

By-pass system for takeoff ups Constitution's rating by 800 hp.

A new air-ducting system for augmenting engine power on takeoff has been developed by Lockheed Aircraft Corp. for use on the Constitution. Claimed as an engineering precedent, the new ducts shorten air intake and exhaust travel distances and add 800 hp. to the takeoff power of this big plane.

In first flight demonstration of the new system, witnessed by an AVIATION WEEK correspondent, the airplane became airborne after a run of only 1,503 ft. at 89 percent of its designed gross weight of 184,000 lb. and reached a height of 50 ft. at 2,780 ft. from start of roll.

On a subsequent flight at 160,000 lb. gross, the transport was off the ground after a grid-screen recorded roll of only 1,100 ft.

Water injection takeoff power output of its Pratt & Whitney 4360 engines was 3,400 hp., or a gain of 200 hp. per engine over previous tests.

The new ducting by-passes the normal induction system for takeoff so that ram air travels only 8 in., with a single 90-deg. flow bend, directly to the carburetor. Previously, carburetor air had to travel through 15 ft. of ducting, the intercooler, and supercharger with resultant friction losses in ram efficiency of induction system.

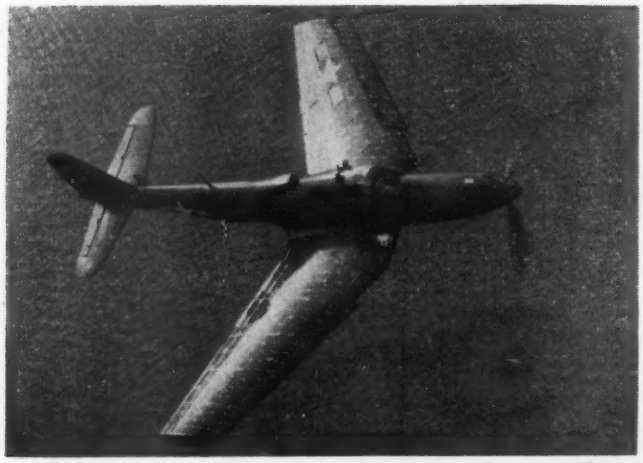
Additional feature of the installation is exhaust collector ring butterfly valve, which in takeoff, is opened to permit engine to exhaust directly into outside air through opened cooling skirt and in a manner that carries flame over top surface of wing during the brief period of takeoff.

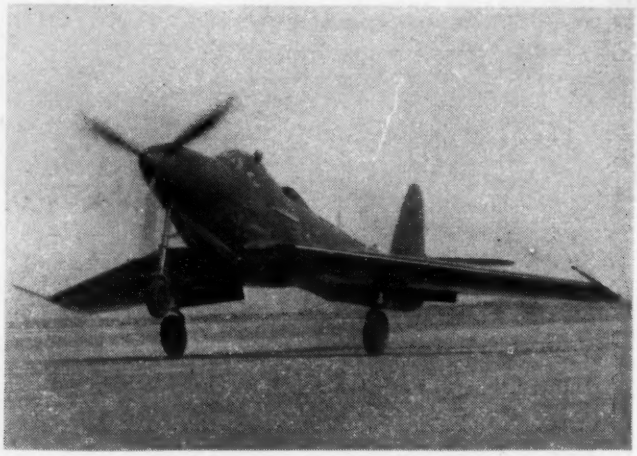
Constitution project engineer, W. A. Pulver, points out, however, that success of the technique with the Constitution does not necessarily approve its application to all installations of the P&W Wasp Major. Obviously, varying designs of air intake ducting will set up differing conditions and varying gains in power output through installation of a takeoff short duct system.

Constitution in test flight takeoff, less than 4,000 ft. from start of roll. Note steep climb angle and that main gear and nose wheel are already in retracted position.

Further structural changes in the plane itself include removal of the overhead windows above pilot and co-pilot and their replacement with solid metal plates. This was done because flight crews found that little was gained, in respect to safety vision, by overhead glass panels; and one of the panels (above pilot) was responsible for an explosive decompression in flight at 25,000 ft.

A previous explosive decompression—caused by rupture of a fabric pressurized covering of crew escape duct, leading from top deck to bottom of fuselage—had established graphically the need for all active crew members to be prepared to make instant use of oxygen systems in event of a sudden cabin pressure failure and total decompression. When the chute cover failed, anoxia reactions were experienced almost instantly by personnel, some of whom had become distantly removed from oxygen outlets. Pilot, in this instance, had just completed a routine check of his mask, and his ability to make immediate use of it was a factor in maintaining full control of the plane and effecting a successful landing. Crew members reported decompression discomfort was moderate and without lasting effect.





Swept Wing Taxes Piloting Skill

Bell L-39, first U. S. swept wing airplane, is test vehicle in effort to develop essential data for our high speed fighters.

By ROBERT McLARREN

Though use of wing-sweep for increasing the critical Mach number of an airplane was evolved as a consequence of theoretical calculations,[1] the handling characteristics of such configurations—particularly at low speeds—have required actual flight tests with an experimental aircraft.

Results of tests with the first U. S. swept-wing plane (in which sweep was used for high speed drag alleviation as distinguished from stability) are now available and indicate the nature of low speed stability and control difficulties of this configuration.[2]

► **Details of L-39**—Early in 1946, the Navy Bureau of Aeronautics prepared specifications for a swept-wing test aircraft and a contract was awarded to the Bell Aircraft Corp. for the construction of two complete airplanes.

The odd design, designated L-39, consisted of a standard Bell P-63 Kingcobra fighter modified to incorporate outer wing panels swept back 35 deg. along the 25 percent chordline.

The wing area remained substantially the same but the sweepback reduced the span 4 ft. 8½ in. The main gear was redesigned into a fixed installation and the absence of armament and combat equipment saved nearly 800 lb.

To provide the increased directional stability required, a monocoque section 4 ft. 4 in. was added behind the power plant compartment, a large ventral fin was also added, and the entire aft portion of fuselage was tilted up.

First test flights of the L-39 were carried out by Bell test pilot Alvin M. "Tex" Johnson in the spring of 1946 and the two planes were subjected to an extensive flight test program at Buffalo throughout that year. Meanwhile, the National Advisory Committee for Aeronautics at its Langley Laboratory conducted extensive wind tunnel tests on an L-39 model to determine basic aerodynamic data.

The two L-39 airplanes were delivered to Langley Field early the following year for more comprehensive flight tests by the NACA. A detailed study of the configuration was undertaken by NACA Test Pilot John P. Reeder and NACA Engineer S. A. Sjoberg, and the project continued through the summer of 1947.

As a result of the wind tunnel test program, the NACA fitted the L-39 with 40 percent-span fixed slots extending from the 40 to 80 percent of each semispan to improve the airflow over the aileron region at high angles of attack. These slots were later extended to the wing tips but available data only cover the 40-80 percent installation.

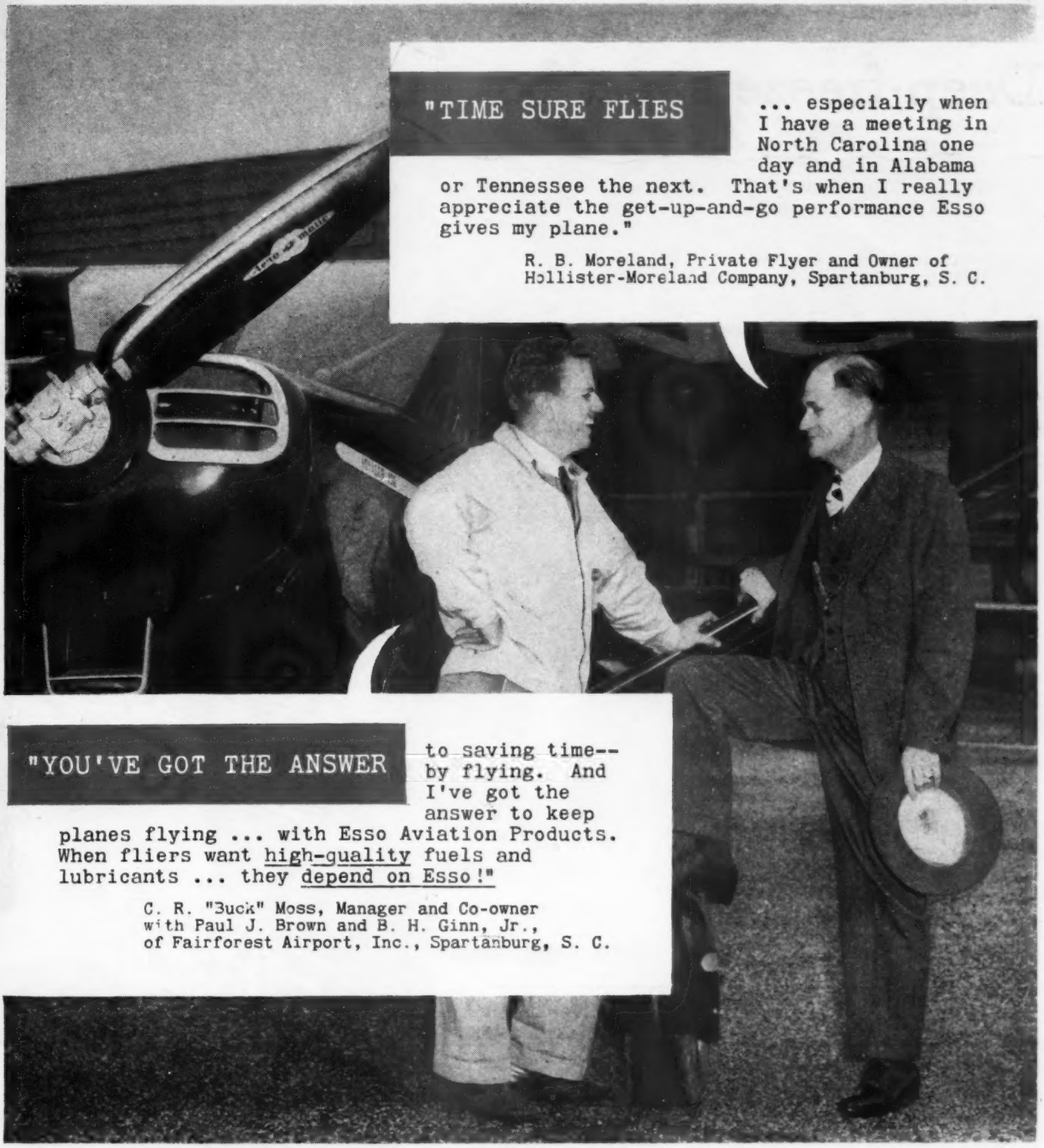
► **Test Data**—Chief result of the flight tests to date is the sweep impairment of lateral stability. This condition arises from the large dihedral effect of swept-back wings.[3, 4] Since the L-39 has zero dihedral, it exhibited a high degree of directional stability with and without the rudder at all airspeeds tested. The yawing oscillations of the plane with stick both free and fixed were satisfactorily damped but the rolling moments produced by these oscillations were relatively large.

At low speeds (such as during landing and takeoff) the L-39 produces a high dihedral effect, which results in large aileron deflections being required to correct the effects of rudder movement. This would indicate that swept-wing aircraft may be difficult to fly during take off and landing, a tendency borne out by extensive wind tunnel tests. At higher speeds, the opposite is true and the dihedral effect becomes low and even negative, rendering the aircraft difficult to fly in gusts and turbulent air.

Indications that swept-wing aircraft have comparatively poor maneuverability appear in the low maximum rolling velocities attainable with the L-39. The tests show that the plane has a maximum value of $pb/2V$ (p is the rolling velocity in radians per second, b the wingspan in feet, and V the true airspeed in feet per second) of only 0.052 for a right roll and 0.059 for a left roll at 200 mph., considerably below the value of 0.07 considered the minimum satisfactory.[5] At speeds below 200 mph. the L-39 displayed even lower rolling velocities. However, the control forces were low, considerably less than the maximum recommended.

While generally confirming predictions based on NACA wind tunnel tests and theoretical calculations[6, 7, 8] the L-39 tests were the first full scale flight tests permitting pilot reaction to swept-wing aircraft handling qualities. The results reported here are interim data and the program is being continued with special reference to biconvex and double-wedge airfoil sections on swept-wings at low speeds.

(References indicated by superscripts in text are available on request.)



"TIME SURE FLIES

... especially when I have a meeting in North Carolina one day and in Alabama or Tennessee the next. That's when I really appreciate the get-up-and-go performance Esso gives my plane."

R. B. Moreland, Private Flyer and Owner of Hollister-Moreland Company, Spartanburg, S. C.

"YOU'VE GOT THE ANSWER

to saving time--by flying. And I've got the answer to keep planes flying ... with Esso Aviation Products. When fliers want high-quality fuels and lubricants ... they depend on Esso!"

C. R. "Buck" Moss, Manager and Co-owner with Paul J. Brown and B. H. Ginn, Jr., of Fairforest Airport, Inc., Spartanburg, S. C.

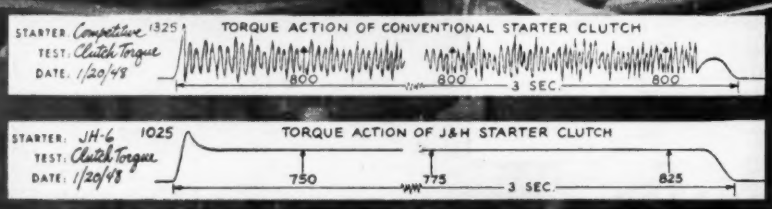
YOU CAN DEPEND ON

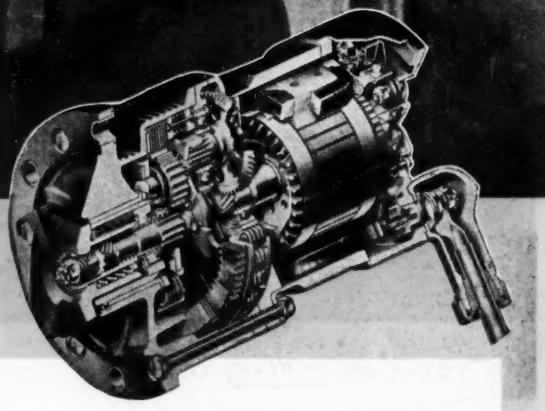
EXECUTIVE AND PRIVATE FLYERS:

To save time and trouble on flights ...to have accurate records of fuels and lubricants used, landing fees, costs of overnight storages and minor emergency services...to enjoy the facilities of the largest group of airport operators selling under one brand from Maine to Texas —

USE AN ESSO CREDIT CARD!

Deep-freeze sweat box





This J & H starter is being tested under the most severe operating conditions of low temperature and locked jaw. The smooth characteristics of its torque limiting clutch are shown on the tape above, in comparison to a conventional unit.

This is only one of the many gruelling tests afforded by Jack & Heintz extensive laboratory facilities to give you *smooth operation, easy maintenance and light weight.*

Write for the new catalog describing the *complete family* of J & H starters, inverters, generators and aircraft motors.

Lower your costs with

JACK & HEINTZ

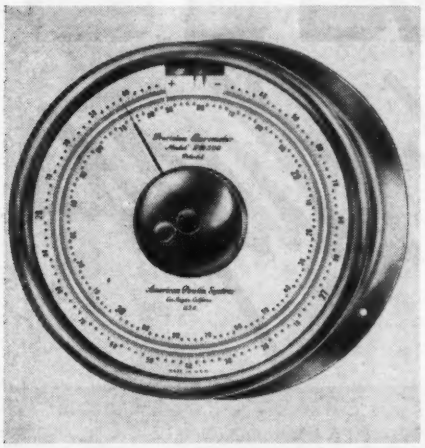
Dependable
Aircraft Products

Aviation Division • **JACK & HEINTZ PRECISION INDUSTRIES, INC.** • *Cleveland 1, Ohio*

NEW AVIATION PRODUCTS

Precision Barometer

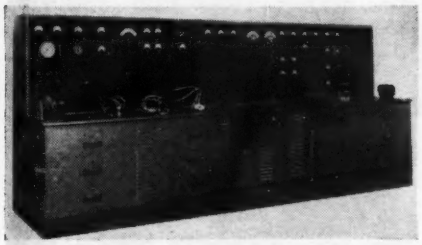
Affording various models for airports, weather stations, and laboratories, is new series of precision barometers made by **American Paulin System,** 1847 So. Flower St., Los Angeles, Cal., designed



to offer advantage over mercury column in readability and simplicity of operation. Change in atmospheric pressure is instantly indicated on dial and read directly in inches of mercury. Type PB500 aneroid instrument, graduated in increments of 1/500 in. of mercury is intended for scientific and lab use.

Facilitates Electrical Checking

New test equipment announced by **Unadco Mfg. Co.,** New Haven 9, Conn., for testing numerous electrical components on large aircraft such as Boeing Stratocruiser, Douglas DC-6, and Lockheed Constellation, is also suitable for checking installations on smaller commercial planes. Overall test bench, adaptable for airlines having medium number of craft to service, permits three men to work simultaneous to check many components. With large number of aircraft, bench can be used by inspection department as final check,



so as not to tie up production test equipment. For programs to improve testing methods, bench serves as versatile experimental unit. Also offered are individual benches performing separate functions for easy location in various maintenance areas.

Saves Steel-Cutting Costs

Hand torch for cutting stainless steel is intended to afford economical manual flame procedure for all types of plant and shop operations. Made by **Air Reduction Sales Co.,** 60 E. 42nd St., New York 17, N.Y., unit is available in 21 and 36-in. lengths, both with 90-deg. head. Features include durable Monel metal head, stainless steel tubes for rigidity and heat resistance, stainless steel lever and ribbed handle for maximum ease of operation, remote control cut-off to automatically coordinate flux feed with cutting oxygen (eliminates separate flux control), and standard cutting tips.

For Aircraft Spray Work

New spray gun offered by **Kellogg Div. of American Brake Shoe Co.,** 97 Humboldt St., Rochester 9, N.Y., is stated to give exceedingly smooth finish through very fine atomization. Detrimental effects from air pressure drop

and eddy currents are eliminated by using ample air passages in gun body and by providing uniform flow of air streams from wing jets and center orifice. Head can be quickly detached, and single fluid-needle assembly removed easily for cleaning. Distributors in air cap wing jets are intended to maintain perfect pattern at highest spray pressures, eliminating fishtail or split in spray pattern. Only three spray heads are required to cover full range of paint materials.

Technical Tracing Medium

"Papercloth," technical drawing paper, introduced by **Clearprint Paper Co.,** Dept. 1-S, 15 First St., San Francisco, Calif., is stated to have marked stability under all atmospheric conditions, resisting stretching, shrinking and buckling, with surface taking to pencil or ink with equal facility. Product permits easy erasing and resists damage from creasing or folding.

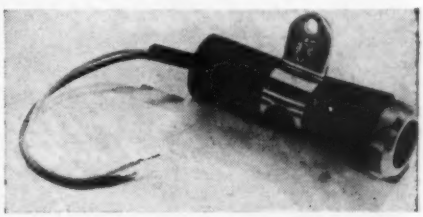
Chute Combines Safety, Comfort

Fitting inconspicuously into upholstery of plane chair, chute announced by **Pioneer Parachute Co.,** Manchester,

Conn., may be adjusted in matter of seconds. Easy to install, unit offers private plane owners cabin utility plus safety, and eliminates need for wearing chute in flight. Constructed in accordance with military standards, chute is made of Nylon, with webbing of high tensile strength. Canopy is regular 24-ft. size.

Inexpensive Instrument Lighting

Improved instrument illuminator announced by **Fairchild Camera & Instrument Corp.,** 88-06 Van Wyck Blvd., Jamaica 1, N.Y., is molded from durable plastic, uses standard lamps, and is equipped with pigtails and wire nuts furnished for quick connection to plane's wiring system. Marketed as Moon-Glo, unit is available in 12- and 24-v. types. Adjustable light intensity and elimination of instrument glare help to keep eyestrain at minimum. In addition to serving for illumination of complete panels, magnetic compasses, and



special groups of instruments at navigator or radio operator stations, brighter light is available through barrel window for map reading, cabin lighting.

AUTO-LITE

Aircraft Spark Plugs

AUTO-LITE aircraft spark plugs all have C.A.A. approval for use on engines as specified. These include Lycoming, Continental, Franklin, Warner, comprising practically the entire volume produced for light aircraft. Send for literature containing complete information.

THE ELECTRIC AUTO-LITE COMPANY
Toledo 1, Ohio
Toronto, Ontario

Tune in the Auto-Lite Radio Show Starring Dick Haymes—Thursday Nights, 9:00 P.M. —E.T. on Columbia Broadcasting System

Money cannot buy a better Spark Plug

Slim Prospects For Private Flying Aid Seen in Air Policy Report

Priority on military expenditures by Congressional board overshadows civil aviation. Report sidesteps veterans flight training issue.

By ALEXANDER McSURELY

Slim prospects for material assistance to the private flying branches of U. S. aviation from government appears likely from analysis of sections of the Congressional Aviation Policy Board report.

Although a general statement of policy in the report urges that "every recognition and encouragement" be given to the small business man in aviation a later comment indicates the Congressional board sees little connection between private flying and air power. "Private flying should not be neglected but it must take its priority after those segments more directly concerned with military air strength," the report declares.

▶ **Low Priority**—In view of the large expenditures for military air strength which are indicated as essential, there appears little "priority" left for private flying.

The report omits making any recommendation on government-sponsored flight training, neatly sidestepping the current battle on veterans' flight training, and not suggesting any alternative.

▶ **Overhaul Contracts**—Only tangible assistance to the fixed base operator group appears in a recommendation that "a portion of military aircraft should undergo overhaul on a contract basis by civilian organizations and the employes of these organizations should be encouraged to be members of a reserve component of the armed services."

This recommendation if carried out could mean a large amount of new business to the larger fixed base operations which are approved for overhaul work. However it will do nothing for the smaller operations which do not have overhaul facilities. Fixed base operators have recommended repeatedly that they be permitted to contract for military aircraft overhauls maintaining that they could do the job more efficiently and economically than military air bases.

▶ **War Needs Cited**—The report states that the present practice of overhauls in depots of the military services may take care of peacetime needs, but falls short of providing necessary maintenance facilities and personnel for combat units in event of hostilities. Privately owned as well as military facilities must be used for military aircraft overhaul in the continental U. S. in war. It is essential that some of these contract overhaul establishments be maintained in readiness through contract overhauls in peacetime, ready for emergency expansion. If employes are in the military reserve it will be possible to withdraw some of them for active duty, leaving a nucleus of skilled personnel for expansion of facilities at the fixed bases.

▶ **Airport Problems**—Referring to airports, the Congressional board suggests that airport planning must give first consideration to larger than to smaller fields, and calls for increasing the number of class IV (4500 ft. runway) and larger airports. Report states that adequate airports for efficient safe and dependable operations in all weather by an expanding commercial air fleet, planned to handle the traffic volume in an emergency, is a necessary part of the Radio Technical Commission for Aeronautics program for all-weather flying and should have priority over matters outside the program. Future of small airports in expansion of postal service "should be given consideration," report says.

Contact flying is apparently expected to give way to flying with navigational aids developed under the RTCA program, so the report suggests CAA consider gradual elimination of beacons on lighted airways, except those used as markers for airports and emergency fields. (A total of 2050 beacons are now operated by CAA at a cost of $625 a year each, of a total annual cost of $1,281,250. A recent poll taken by CAA among airmen brought back replies asking that the lighted beacons be continued in operation as a visual navigation aid and a backstop in event of radio failure.)

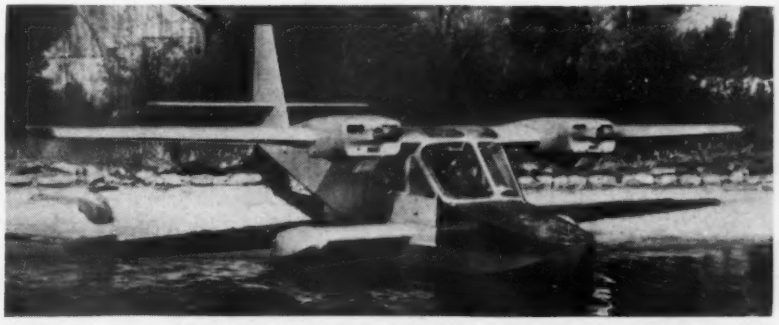
▶ **Volunteer Observers**—Weather Bureau is asked by the report to designate volunteer weather observers at airports where no official observers are stationed, to fill gaps in the present airport weather reporting system. (Weather Bureau officials told CAA last week that there was no room in their teletype circuits for additional reports from such volunteer observers if they were appointed.)

Joint military-civilian use of airports and airways facilities should be agreed upon through consultation between CAA and the military services referring disputes to the Air Coordinating Committee.

Report holds that it is extravagant for communities to build new airports when existing military facilities will serve, and that joint use should be made whenever safety or military security will not interfere.

Other recommendations affecting private flying and fixed base operations:

• **Federal government** should continue to have exclusive jurisdiction over establishment of safety regulations applicable to all classes of aircraft and airmen, but administration and enforcement should



NEW AMPHIBIAN

First photo of the Aqua-I, six-place amphibian built by Aquaflight Inc. of Wilmington, Del. A high wing, all metal fuselage plane with a wooden hull, its tricycle gear retracts fully for water landings. It is powered by two Lycoming O-209As (125 hp. each), and has a claimed cruising speed of 125 mph. (British Combine photo)

be delegated through appointment of designees to certificate aircraft as well as airmen, and through amendment of federal laws to give concurrent jurisdiction to state courts and aviation agencies to enforce non-air carrier safety regulations including right to suspend airmen's certificates. Manufacturers of light aircraft should be delegated greater responsibility for design standards.

• **Congress should** give earliest practicable attention to forming basic policies governing expeditious and orderly development of air cargo, contract flying and charter service.

• **Flight and technical** aviation courses in colleges and universities should be promoted with full scholastic credit, and aviation courses should be stressed in primary and secondary schools, to provide an air-minded public and a reservoir of technically trained personnel.

Group Would Bar Spin Tests in Exam

Elimination of the spin tests from private flight examinations was recommended to Administrator T. P. Wright last week by the CAA Non-scheduled Flying Advisory Committee. Recommendation was made with one dissenting vote from Fred Weick, designer of the spinproof Ercoupe, and vice president of Engineering & Research Corp.

Instead of the spin test the committee suggested that applicants for private license should merely be required to demonstrate their ability to recover from power-on or power-off stalls. In a related recommendation, installation of stall warning indicators was endorsed. The committee said this should be voluntary not mandatory. There is some indication CAA may approve the elimination of spin test for private pilots flying in planes equipped with stall indicators.

▶ **Renting Planes**—A recommendation that CAA flying personnel buy their own airplanes and receive mileage pay instead of the current proposal for rental of aircraft from fixed base operators was made.

Approximately half of the advisory committee are retiring following this meeting. Appointments replacing those whose terms have expired will be announced soon. William H. Klenke, Jr., sales manager of Stinson division, consolidated Vultee Aircraft Corp., took office succeeding John Friedlander, former president of Aeronca Aircraft Corp. Those whose terms are expiring include: Weick; William A. Mara, Bendix Aviation Corp. advertising director, chairman of the council; Harry Playford, U. S. Airlines, St. Petersburg, Fla.; Allison Gillies, San Diego, Calif.; and Ed Williamson, Seattle. Another vacancy on the committee resulting from the recent death of Dick Depew, well known pilot and aviation business man, is also to be filled.

▶ **Suggestion Declined**—A suggestion by the members of the committee that all resign, concurrently with Administrator Wright's resignation active date, was declined by Wright, who said that the work of the committee would be impaired, if it did not continue in operation.

Other important recommendations for CAA action by the advisory group:

Endorsement of proposal that personal plane manufacturers be permitted to certificate their own airplanes, after being judged competent by CAA, eliminating much inspection red tape which runs up costs of plane production.

Recommendation for more prompt dissemination of CAA technical information to regions. (Case was cited of a propeller being approved in one region and not approved in another.)

Recommendations for less regulatory interference in airports, with particular reference to the requirement eliminating exclusive rights for gasoline sales on airports financed by federal funds.

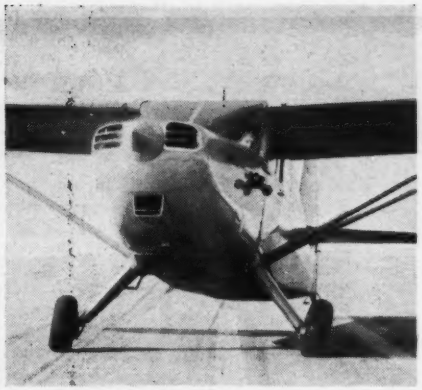
Personal Aircraft Shipments

Personal aircraft deliveries during January totalled 462 of which 211 were four-place and 251 two- and three-place designs. Cessna led the 13 companies reporting to the AIA Personal Aircraft Council in total deliveries with 108 two- and four-place models. Largest single model production was the Stinson Voyager four-place design of which 100 were delivered. Other leaders were the Luscombe Silvaire two-place with 62 deliveries, the Beech Bonanza four-place with 61 deliveries and Piper two-, three- and four-place models with 42 deliveries. One Aeronca L-1 6A liaison plane was delivered under Air Force contract.

Total dollar volume of the shipments was $1,897,000 compared to the $2,069,000 receipts for 520 shipments last December. Payments received from the Air Force totaled $73,000 which, however, does not represent the value of aircraft shipments for the month. Details are as follows:

	Complete Aircraft Shipments		*Manufacturers Net Billing Price Shipments*	
	January 1948	*December 1947*	*January 1948*	*December 1947*
			(Thousands of Dollars)	
Aeronca				
Scout	2	1		
Chief 65 hp.	1	..		
Super Chief 85 hp.	9	18	43	59
Champion 65 hp.	5	6		
Champion 85 hp.	5	5		
All American—1 OA	22	N. A.	..	N. A.
Beech—Bonanza	61	64	466	492
Bellanca—Cruisair	4	6	20	30
Cessna				
120	26	12		
140	69	13	362	172
190	4	3		
195	9	8		
	108			
Engineering & Research				
Ercoupe	9	27	23	70
Fairchild—F-24	9	8	38	36
Funk—Bee	N. A.	5	N. A.	20
Luscombe—Silvaire	62	107	153	209
Piper				
Cub Special	27	27		
Cub Trainer	..	8	92	83
Supercruiser	16	7		
	43			
Republic—Seabee	1	5	5	20
Ryan—Navion	23	16	155	111
Stinson—Voyager	100	146	485	694
Taylorcraft	4	8	7	14
Texas Engineering—Swift	16	20	48	59
Total Personal	462	520	1,897	2,069
L-16	1	104	73*	130*
TOTAL	463	624	1,970	2,199

N. A. Not Available * Payments from U. S. military customers



CROSS WIND STINSON

First photo of a four-place Stinson Flying Station Wagon equipped with the new Goodyear cross-wind landing gear wheels. Wheels are now available in 6.00-6 size, most popular for lightplanes, with entire castering mechanism for cross wind landings built into the wheel. Stinson and Cessna thus far are the only lightplane manufacturers to announce approval of the cross wind wheels on their models, as optional equipment.

Shortage of Hangars Bar to Private Flying

Serious shortage of hangar space is the greatest deterrent to aviation in Wisconsin, according to opinions expressed at the second annual Wisconsin Aeronautics Conference recently held at Milwaukee.

Howard A. Morey, chairman of the state aeronautics commission, said the hangar space shortage is preventing many pilots from buying planes and is keeping many communities from developing their airports. He asserted that many people who want to own planes refuse to keep the aircraft outdoors during the state's severe winter weather.

► **Rental Problem**—Declaring that it is virtually impossible for any flyer to rent space at any municipal airport on which to build a hangar, Morey said, "if we could get the mechanics of those leases ironed out we would solve our major problems overnight."

Lane W. Wilcox, superintendent of the CAA airport branch office in Chicago, said about 85 percent of the planes in the United States need hangar space, and that every one of those plane owners would be willing to pay a fair rental for a hangar. He pointed out that repair bills on planes kept out of doors are so high that renting a hangar would be a distinct economy.

Lester J. Maitland, recently appointed state aeronautics director, said the Wisconsin Aeronautics Commission hopes to get municipalities throughout the state to work out arrangements allowing flyers to rent hangar space at respective airports.

BRIEFING FOR DEALERS & DISTRIBUTORS

LUSCOMBE CERTIFICATION NEAR—Only routine testing for exact stalling speed, cruising speed, rate of climb and similar data, stands between the four-place Luscombe Silvaire Sedan and CAA certification, H. G. Erickson, Luscombe chief engineer, reported last week. The 165 hp. Sedan has passed its spin and dive tests. Allowing for normal weather, Erickson expects first production models of the four-place Luscombe will be ready for delivery late this Spring. Unusually bad weather at Dallas this winter has delayed testing.

NEW CESSNA 190 FLOATPLANE—Cessna Aircraft Co. has received CAA approval for a floatplane version of the all-metal four-to-five place Model 190 (and Model 195). Principal alterations, except for the floats, call for addition of two small all-metal fins at the elevator tips, giving the plane a triple-tail fin configuration. Fins were needed for additional directional stability. Double water rudders on the Edo Model 3430 floats are actuated by cables leading from a horn installed at the location where the tail-wheel is placed in the landplane version. The 195 floatplane, which uses a 300 hp. Jacobs engine, is described as the fastest commercial floatplane on the market. Cruising speed is more than 130 mph. at 7000 ft. at 70 percent power. Top speed exceeds 150 mph. The 240 hp. Continental-powered 190 has cruising speed greater than 120 mph. and top speed above 140 mph. Takeoff is described as unusually good due to the Hamilton Standard controllable propeller. As a cargo plane, the 195 on floats can carry 900 lb. cargo with 300 mi. range or 600 lb. cargo with 600 mi. range.

TAYLORCRAFT MOVES—C. G. Taylor, president of Taylorcraft, Inc., Alliance, Ohio, has announced that his company is moving its offices and service department from the Armour plant at the Alliance airport, to a building at 1545 East Patterson street, Alliance. The new quarters provide approximately 18,000 sq. ft. of floor space and in addition the company is retaining a 10,000 sq. ft. building where planes are being assembled. It is planned to increase the present total of 40 employes soon.

NAME SKYWAY—Plans to name Skyway One, the Washington-Los Angeles airway for private flyers, the "Wright Way" honoring Orville and Wilbur Wright have been announced by the U. S. Skyway One Association. Dedication ceremonies for the skyway on April 24 will center at Dayton, Ohio, home of the Wrights and location of their laboratory and airplane factory. Other programs will be held in Los Angeles, Oklahoma City, Dallas, Washington, and other principal cities along the route. When the Skyway One survey flight last September stopped at Dayton, Orville Wright recalled to this writer that probably the first airmarked route in the world was between Indianapolis and Dayton, laid out in 1912 by signs painted on barn roofs and indicating the nearest safe cow-pasture landing fields. Skyway One parallels this earliest route.

BONANZA RECORD—A flight from Sky Harbor on the North Shore of Chicago, to Roosevelt Field, L. I., in 3 hr. 20 min. is reported by David N. Laux, magazine publisher, in a Beech Bonanza owned by Sports Afield Publishing Co. The flight skirted Lake Michigan, and totaled an estimated 760 miles, Laux reported, at an average speed of 228.6 mph. Beech quotes a cruising speed of 172 mph. for the Bonanza, which would mean that Mr. Laux had the advantage of a "following wind" of around 56 mph. to boost his ground speed. The speed is believed a new record for a plane of the Bonanza's power class.

WISCONSIN OPERATORS CONTRIBUTE—Wisconsin Aviation Trades Association is asking each of the state's flight schools in which a GI flight program is carried on to contribute $100 for a campaign fund to help retain the veterans' flight training. E. Merritt Anderson, association president, and head of Anderson Air Activities, Billy Mitchell Field, Milwaukee, said that part of the funds would be used by industry spokesmen at Washington, and that the state association also would hire a part-time secretary to work for changes in Wisconsin aviation laws and regulations. Main objects of the state campaign are to eliminate a regulation requiring all veterans seeking flight training to get clearance from VA officials, and to obtain a standard license fee for airplanes, similar to the auto license fee. Anderson reported that the program of flight training had proved helpful to many veterans and that virtually all graduates of advanced flight courses in Wisconsin had been able to get jobs in aviation.

—ALEXANDER McSURELY

PROVING GROUND *of a business built out of thin air*

● Glance through the porthole of this magic Stratolab here at AiResearch. You see men and miraculous instruments "flying" ten miles high above the earth where air is thin and cold... or "diving" faster than the speed of sound!

Most complete of its kind in the world—the AiResearch Laboratory is used to test *and prove* specialized high-altitude equipment designed and built by AiResearch.

This equipment includes "custom tailored" cabin super-chargers, cabin pressure regulators, cooling turbines, oil coolers, electric actuators, heat exchangers, and complete air conditioning systems for today's modern aircraft.

Thus, months before the new super transports or screaming jets take the skyways, AiResearch engineers find the answers to problems of creative engineering and research never known before.

Today the vast reservoir of experience, the special skills and the laboratories used to solve these unusual problems are available to you.

In whatever field your business lies—the creative engineering of AiResearch may open the way to greater efficiency... lower costs... a better product.

For more complete information, write: AiResearch Manufacturing Company, Los Angeles 45, California.

AiResearch
DIVISION OF
THE GARRETT CORPORATION

WAL Finds Consolidation Vital To 'Belt-Tightening' Program

Drinkwater describes joint service agreements and urges entire industry to take liberal doses of same medicine in interest of economy.

By SCHOLER BANGS

A notch-a-month "belt-tightening" shows promise of restoring Western Air Lines to financial health by the end of this year. The carrier was on the verge of bankruptcy at the start of 1947.

A 40 percent slash in company personnel from 2563 in October, 1946, to about 1500 at present has been only one item in the carrier's economy program. Sale of the Denver-Los Angeles route and equipment to United Air Lines last August for $3,750,000 put the company well in the black for 1947. In 1946 Western had a net loss of more than $900,000.

► **Prescription Recommended**—WAL is taking liberal doses of consolidation at every turn, and President Terrell C. Drinkwater believes it good medicine that the entire air transport industry will have to accept if recovery from postwar financial sickness is to be effected.

When Drinkwater talks of consolidation, he means consolidation of all airline functions which reasonably can be executed by one staff to serve two or more carriers in a given area. Throughout its system Western is entering into agreements with other carriers for mutual benefit in ramp service, field maintenance, cargo handling, radio service, field ticketing and reservations services, and even city ticket office sales.

► **Railroad Pattern**—Drinkwater told AVIATION WEEK that "these are no more than the things the railroads learned to do, and do efficiently, years ago. It is amazing that in their 20 active years the airlines haven't shown equal good sense.

"The only reason I can see why people in the airline business don't consolidate today is because they didn't do it yesterday—they seem to have to go looking for a precedent when a new but really old idea hits them in the face. We're well along in trying out consolidation ideas up and down our system. The resistance has been strong, but we're making headway.

► **Rugged Individualism**—"My only concern is that after all of us get on our feet there will be some who feel the twitch of rugged individualism and begin thinking about the 'good old days' when everyone has his own beautifully confusing empire of independent sales and servicing staffs; cluttered air terminal ramps with separately-owned, brightly-decorated masses of carts, trucks and loading gear; and ramp crews who wondered what to do with themselves between planes. If that ever happens we should have our heads examined."

Here are results of Drinkwater's efforts of the past six months:

• **Minneapolis**—Mid-Continent Airlines provides Western with complete airport ground handling in addition to radio service. At the WAL city ticket office Western handles ticketing for Capital Airlines (PCA). The latter carrier has no personnel in this office.

• **Rochester, Minn.** – Mid-Continent provides radio coverage for Western, and WAL has the use of MCA's ramp equipment on a joint lease basis.

• **Lethbridge, Alberta** – Trans-Canada Air Lines provides WAL with complete service at the airport in addition to reservations and ticketing.

• **Butte, Mont.**—Western services Northwest Airlines' aircraft with gasoline, and negotiations are under way for WAL to provide radio coverage for Northwest.

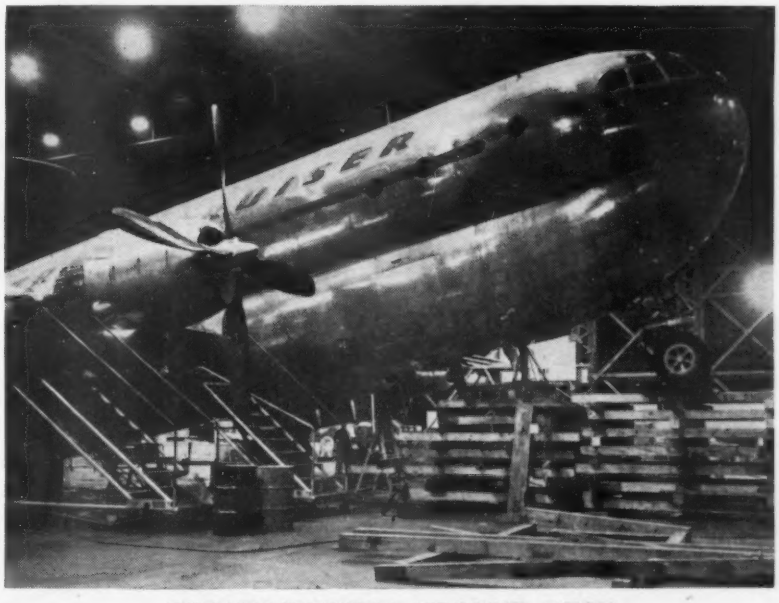
• **Ogden, Utah**—Negotiations are under way with United for joint ticket office.

• **Salt Lake City**—Western services Monarch Air Lines at the airport and also handles radio coverage and reservations for the feeder.

• **Las Vegas, Nev.**—Western provides complete airport ground services for United in addition to handling radio coverage and reservations. WAL also has an agreement with United in a joint city ticket office. At the airport, TWA and Bonanza Airlines provide Western with emergency mechanical service.

• **San Diego**—Nelson & Kelly, a fixed base operator, furnishes emergency maintenance and gasoline service for Western. Effective last month, WAL was to move in with American Airlines for joint occupancy of a city ticket office.

• **Los Angeles**—Western services one flight a day for Southwest Airways, providing a mechanical turn-around check. WAL also operates a joint porter and baggage service with American at the airport.



STRATOCRUISER GROUND TEST

Its nose tipped upward 8 ft., a Boeing Stratocruiser is shown in a possible extreme flight attitude during a fuel flow check which was part of CAA's ground inspection of the craft.

• **San Francisco**—Western provides complete ground and radio service for American. WAL and American are joint tenants in two city ticket offices.

• **Oakland**—Western provides ground service and radio coverage at the airport for American and also participates in joint porter arrangements with TWA, United and American. Western and American share a city ticket office.

• **Portland**—Northwest furnishes complete services at the airport.

• **Seattle**—Northwest provides complete services at the airport, including turnaround check maintenance.

So far, Western has been unable to create any rule-of-thumb basis for effecting consolidation agreements. Each has been a negotiated contract, whether worked out on a basis of a man-hour pro rata of fees paid by the participants or a division of costs on the basis of volumes of business produced in a given area. WAL has found cases where another airline is willing to enter into a field service consolidation arrangement at one city but is unwilling to do so in another community because at the latter point the two carriers are competitive.

▶ **Poor Reasoning Seen**—On this subject, Drinkwater states: "Such an attitude doesn't make sense, for there is no reason in the world why two or half a dozen airlines, some of them direct competitors, shouldn't simplify their problems by sharing a common ticket office in which the agent at the counter works for all the airlines. The agent tells the customer who wants to fly from Los Angeles to New York: 'We have schedules by United, TWA and American for your trip. All have nearly the same travel time. Fares are identical. Here are the schedules. How do you wish to be routed?'

"If the individual sales and advertising departments have done a good competitive job, nine times out of ten the passenger already will have made up his mind concerning the airline he is going to use; and any expenditure of money in the ticket offices to change his mind would be wasted."

▶ **Study Under Way**—How much in dollars WAL's consolidations have saved, Drinkwater will not guess. It is too early to arrive at an economy valuation, but he is certain that material savings will show in short time.

A preliminary study of results is being made by Dom P. Renda, assistant secretary and general attorney of Western. A report of his findings will be made to CAB in the company's pending mail rate case to show that despite increased operating efficiencies, mail pay aid is still needed.

(A second article on Western Air Lines' internal retrenchment will appear in the next issue of Aviation Week.)

AIR-AGE PICKETING

A lightplane trailing a banner reading "National Airlines Pilots on Strike" recently appeared over Miami as the Air Line Pilots Association adopted a new wrinkle in picketing. With NAL continuing to reinstitute service to additional points on its system using non-union pilots, ALPA asserted it would extend its aerial picketing to all cities into which the carrier operates.

NAL Pushes Service Despite Pilot Strike

Now the longest pilot walkout in air transport history, the National Airlines strike has entered its second month with little indication of settlement.

The carrier last week announced that all pilot vacancies have been filled. G. T. Baker, NAL president, said his company had selected the most qualified and experienced pilots from thousands of applicants.

▶ **Santa Fe Pilots**—Among the new pilots were 15 formerly employed by Santa Fe Skyway in its recently discontinued all-cargo operations. Santa Fe ground personnel also were to join National, replacing mechanics who walked out before the pilots struck. President Baker assured the non-union pilots that their jobs were permanent.

By the beginning of last week, National had resumed service on its Miami-New York and Miami-Havana links. Previously, flights were reinstated between Miami and New Orleans and between Miami and Key West.

▶ **Injunctions Obtained**—National has obtained court injunctions restraining members of both the Air Line Pilots Association and International Association of Machinists from acts of violence or threats of violence. The carrier alleges that the injunction has been violated by the machinists.

ALPA has expanded its aerial picketing (with banners towed by lightplanes) to include ground picketing of ticket offices. The union said it would establish picket lines at every station on National's system.

▶ **Mail Pay Fight**—Meanwhile, the carrier has received promise of additional mail pay from CAB based on conditions existing prior to the strike. ALPA last week planned to protest the action, charging that CAB in effect was bolstering the company in the bitter-end fight with the pilots which will have an important bearing on the union's future position in the entire air transport industry. The pilots said that on two previous occasions, CAB had turned down National's request for more mail pay.

Finding that NAL's financial position is critical, the Board issued a show cause order which would give the company a total of $545,000 for the period July 14, 1947, through Dec. 31, 1947. The payment is on a basis of 60 cents a ton mile for a minimum capacity factor (false load) of 450 lb. per plane mile flown.

Actually, National carried less than 100 lb. per plane mile, and under the straight 60 cents a ton mile rate (without the minimum capacity factor) it would have earned about $105,000 from mail pay in the 5½-month period. Thus the Board's proposed action will give National additional income of well over $400,000.

▶ **Future Rate**—During 1948, CAB has proposed a minimum capacity factor of 350 lb. for National and 250 lb. beginning Jan. 1, 1949. As a result, NAL may receive around four times as much

mail pay this year as it would have under the straight 60 cents a ton mile rate.

National had told CAB that increased mail pay was necessary to prevent a "disastrous financial collapse." The company had an operating loss of about $475,000 in December and January—the first two months of its usually profitable Florida season.

These deficits were in addition to $1,375,000 in losses during the seven-month period ended last Nov. 30. As of Jan. 31 of this year, National's current obligations exceeded available cash by $323,000.

SHORTLINES

▶ **Aer Lingus (Irish Air Lines)**—Reports a net deficit of $536,624 for fiscal year ended March 31, 1947. Jointly controlled by the Irish Government, British European Airways and British Overseas Airways Corp., the company had gross revenues of $1,509,380 for the year.

▶ **BOAC**—Has acquired an interest in the Bermuda Development Co., owner of hotels and recreation facilities on the island. Pan American Airways and Atlas Corp. also hold interests in the development company.

▶ **British Commonwealth Pacific Airlines**—Will take over the trans-Pacific service from Australia to the U. S. and Canada on April 21. The operation is now conducted by Australian National Airways, a private company which has announced it will fight to retain the service.

▶ **Continental**—Has asked CAB for new routes from New Orleans to San Francisco and Los Angeles via Houston, San Antonio, El Paso, Phoenix and other points; between Denver and Phoenix and other points; between Denver and Phoenix via Albuquerque and other points; and from San Angelo, Tex., Hobbs, N. Mex., and Wichita Falls, Tex., to Houston.

▶ **Florida**—Early this month was slated to start service to Leesburg, Fla.

▶ **Hawaiian**—Reports net profit of $126,795 and operating profit of $186,468 in 1947 against net profit of $188,223 and operating profit of $352,963 in 1946.

▶ **Northeast**—Has been awarded $2,107,579, or 29.36 cents a plane mile, as mail pay over its entire system between May 1, 1945, and April 30, 1947. The payment gives NEA a seven percent return on its investment for the two-year period.

▶ **Northwest**—Has signed an interline pact with Scandinavian Airlines System covering connecting services at New York. Single tickets and immediate reservations between points on the two systems are provided along with joint advertising and a possible interchange of stewardesses. . . . NWA's new Detroit-Washington link is to open March 15.

▶ **Pan American**—Has inaugurated regular weekly service to Johannesburg, South Africa, via the Azores, Dakar, Accra and Leopoldville. . . . Company has asked CAB for an amendment to its Latin American certificate to permit service between Guatemala City, Guatemala, and Los Angeles and San Francisco.

▶ **Peruvian International**—Is laying plans to move several hundred displaced persons from Europe to Chile. TWA would fly the contingent as far as New York, with PIA picking up there.

▶ **Philippine Air Lines**—Hopes to start DC-6 service between San Francisco and Manila next month.

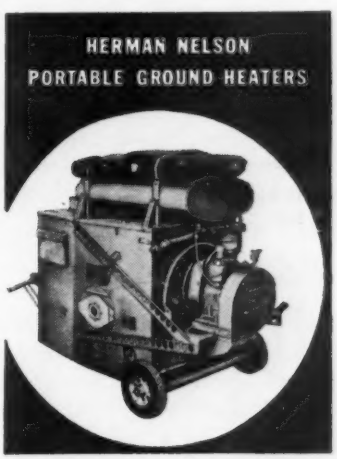
▶ **Sabena (Belgian Airlines)**—Will show a profit in 1947 for the third postwar year. Earnings will be less than the record $2,800,000 in 1946 because of rising costs. Six DC-4s and three DC-3s added last year brought the carrier's fleet to 50 planes. Regular all-cargo flights between New York and Brussels were begun last month.

ABOUT THE *Portable Heater*
THAT MADE GOOD!

Thousands of these units proved their dependability on far-flung air fields during the war.

TODAY — the improved commercial cousin of these hard-heating veterans is making itself indispensable to some of the nation's largest airlines.

Besides preheating aircraft engines, instruments, cabins and cockpits, these units really do the job in combating cold weather maintenance, repair and warm-up difficulties. With Herman Nelson Portable Ground Heaters you can spot quick, clean, safe HEAT where you want it, when you want it, without waste.



Write today for catalog and prices.

THE HERMAN NELSON CORPORATION MOLINE ILLINOIS

SINCE 1906 MANUFACTURERS OF QUALITY HEATING AND VENTILATING PRODUCTS

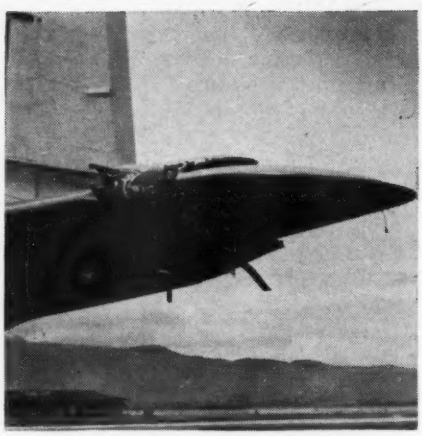
Overseas Parcel Post To Be Ready Next Week

International air parcel post will become a reality March 15 when service is inaugurated between the U. S. and 21 foreign countries. Nations and colonies receiving service are: Austria, Belgian Congo, Bermuda, Czechoslovakia, Denmark, Egypt, Ireland, Finland, Gold Coast, Great Britain and Northern Ireland, Greece, Iceland, Italy, Netherlands, Newfoundland, Norway, Sweden, Switzerland, Tunisia, Turkey and the Union of South Africa.

Packages will be accepted for mailing at any post office in the U. S. and will receive all available domestic air mail service in addition to air transportation overseas. The new service does not apply to territories or possessions of the U. S.

Weight and size limitations, customs declarations, and other conditions that govern international surface parcel post will apply to air parcel post. Air parcels may be registered or insured.

Weight limits range from 11 lb. for the Union of South Africa and Ireland to 44 lb. for 11 other countries. Postage rate for a parcel to Great Britain (where the weight limit is 22 lb.) is $1 for the first four ounces and 41 cents for each additional four ounces or fraction.



RUGGED STABILIZER

This forward cargo door on a Transocean Air Lines DC-4 pulled out 40 miles west of Honolulu. The purser of the all-cargo craft noticed a loose top hinge, but had no time to act before the door was off and folded over the stabilizer. TAL Capt. George Dijeau warned the crew to stand by to ditch, but discovered the damage was not serious enough to prohibit a normal landing at Honolulu.

Southern Airways Tests

Southern Airways, Atlanta, hopes to start service on its 2522-mile feeder system in the southeastern states area by the end of June. The carrier, which will use DC-3s, has begun survey flights.

UAL Signs Agreement With Machinists Union

A new agreement providing substantial pay raises for mechanics has been signed by United Air Lines and the International Association of Machinists. UAL said the one-year pact, which is retroactive to Jan. 1, gives its mechanics the highest wage scale in the industry.

Mechanics' starting wages for the first six months were increased from $1.35 an hour to $1.50; for the second six months from $1.41 to $1.55; third six months from $1.47 to $1.60; fourth six months from $1.53 to $1.65; and for over 24 months from $1.59 to $1.70. Lead mechanics were raised from $1.77 to $1.89 for the first six months and from $1.83 to $1.95 after a half year's service.

Under the agreement the company has the right to require all line mechanics to get CAA mechanics' certificates. The pact also provides that all mechanics may become senior mechanics upon completing two years' service and successfully passing a company examination.

Ground communications technicians were included under the contract for the first time. Wages were established ranging from $305 as starting pay to $345 for over 24 months' service.

BOWSER ESTABLISHED 1885

You can be absolutely sure it's

CLEAN — DRY — SAFE

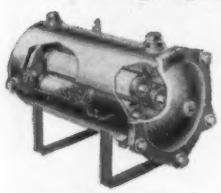
With the New Cartridge Type

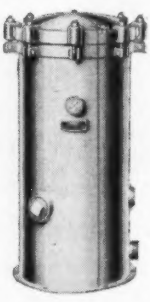
BOWSER AVIATION FUEL FILTER

Removes traces of moisture . . . all foreign matter down to particles as small as two microns (.000078 inch).

Bowser Cartridge Type Aviation Fuel Filters are in service at leading airports.

Bowser filters are built in standard sizes up to 500 g.p.m. capacity—designed to fit any installation requirements. Cartridges may be quickly and economically replaced.





At left, Figure 837 portable model. Normal filtering capacity 50 g.p.m. Cutaway shows interior construction.

At right, Figure 835 stationary model. Filtering capacities up to 500 g.p.m.

Illustrated Literature Mailed on Request

BOWSER BUILDS THE POPULAR SERV-A-PLANE

Bowser engineered fueling systems . . . in capacities up to 4,000 g.p.m. or more . . . to meet any installation requirement.

BOWSER, INC. AVIATION DIVISION

1347 Creighton Avenue, Fort Wayne 2, Indiana

LIQUID CONTROL SPECIALISTS SINCE 1885

Arnold Stall Warning

SURE, SAFE, SIMPLE!

DIRECT SIGNAL — warning is signalled from detector units mounted on trailing edge of wing, so that it originates from stall itself and not from a related effect such as change in attack angle of wing. DOUBLE RELIABILITY—detector units mounted on trailing edge of both left and right wing panels where they can't ice up, buzzer and light in cockpit signal dual alarm. SIMPLE—detectors mount on wing surface. No extensive cutting, no interference with boots or de-icing equipment. SAFE—detectors are outside wing, proof against fuel vapors. COMPACT—detectors measure only 1"x1¼"x3⅜", weigh less than 3 oz. ea. Warning indicator may be mounted in or above panel. PROVEN—now in operation on Luscombe, Cessna, Swift, Navion, Seabee, Grumman Widgeon, and many other craft. LOW COST—only $36.00 for complete kit including two detector units, cockpit indicator and all necessary wiring. Write for illustrated folder of facts.

GORDONAY PRODUCTS COMPANY

2026 Beach St., Flint 3, Michigan

PAA's Domestic Route Bid Opposed by CAB Examiner

Report recommends only restricted service between New York and Miami; little value to public seen in remainder of proposed routes between 12 gateway cities.

Pan American Airways, the nation's largest international operator, has lost an important opening round in its fight to become a giant in domestic air transportation.

Of the eight domestic trunk routes aggregating 14,610 miles which PAA is seeking, CAB Examiner William J. Madden has recommended that the carrier be certificated only for restricted operation on part of one. Madden said Pan American should be given a 1100 mile link from New York to Miami via Philadelphia, Baltimore and Washington, subject to a limitation against the carriage of domestic passengers except on flights primarily providing international services.

▶ **Major Routes**—Already certificated for over 94,000 miles of international routes, PAA requested domestic links between Boston and Miami; Boston and Houston via New Orleans; Chicago and Miami; Detroit and Houston; New York and Seattle; New York and San Francisco; New York and Los Angeles, and Los Angeles and Seattle.

These services have accounted for 32 percent of all domestic passengers and 37 percent of all domestic passenger miles in past periods. Asserting that certification of Pan American for the routes would result in a disastrous diversion of traffic, virtually all the existing trunklines are contesting the application, including American, United, TWA, Northwest, Eastern, National, Delta, PCA, Braniff, Chicago & Southern and Western. The Post Office Department, which said PAA's proposed routes would add little, if any improvement to mail service, also opposes the bid.

▶ **Cities Competition**—Pan American, the only U. S. flag carrier before the war, pointed out that it now has competition from 10 other U. S. overseas operators. Both as a matter of "justice," and as a means of strengthening its system to meet increasingly-severe competition, PAA applied for domestic links connecting the 12 U. S. gateway cities it now serves on international flights.

The fact that its competition comes from carriers which may haul traffic between points on their domestic systems and foreign destinations gives these lines a great advantage, PAA declared. It added that the proposed eight domestic links would provide both domestic and overseas travelers with valuable new services.

▶ **No New Service**—Noting that PAA was asking to enter the most lucrative sections of the domestic air transportation market, Examiner Madden pointed out that all of the route segments in its proposed pattern already are being served by at least one carrier, while the great majority are served by two or more lines. He said passengers bound to and from international points would use less than nine percent of the seats available on PAA's contemplated domestic service.

Pan American declared its domestic service, which it originaly planned to operate with 37 Boeing Stratocruisers and 13 Republic Rainbows, offered an essentially new type, long-haul, high-speed operation at a substantially lower passenger fare (four cents a mile) than now exists. Between New York and Los Angeles, PAA proposed an eastbound run of 6 hr. 16 min.

▶ **Disadvantages Seen**—Examiner Madden said there was some evidence to indicate that PAA's contemplated flight times were unduly optimistic. He questioned the carrier's assertion that existing domestic trunklines have shown little disposition to provide long-haul, nonstop service with high-speed planes and that they have not stimulated manufacturers to produce such high-performance aircraft.

"Improvements in domestic service which Pan American will bring by reason of its being confined to long-haul

NEW RADAR ALTIMETER

Pan American Airways has developed its own modification of a radar altimeter to meet CAB requirements for terrain proximity indicators in all transport aircraft by May 15. Capt. J. T. Rogerson, pilot, and Peter J. Sammon, radio engineer, examine the forward radar antenna mounted on a DC-4 nose. This installation gives warning of terrain ahead and below the plane while a second antenna mounted below the fuselage picks up radar pulses reflected from terrain immediately below for translation into exact altitude of plane above the ground. Forward radar sets off lights and bells to warn of terrain at five selected altitudes between 2000 and 300 ft. Second antenna gives absolute altitude reading on cockpit indicator shown lower right.

Since 1903, Whitehead has been recognized as a source of economical, accurate, and dependable stampings. Send your blueprints for an estimate.

WHITEHEAD STAMPING CO.
EST. 1903

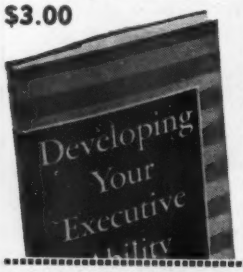
1673 W. Lafayette Blvd.
Detroit 16, Michigan

What makes one man worth $40,000 . . . another only $4,000?

This book tells HOW TO CULTIVATE YOUR TOP-EXECUTIVE QUALITIES

TOP EXECUTIVES aren't born . . . they're made — self-made mostly. They rise along different routes, but the steps to their success are similar. They follow a particular pattern of conduct . . . develop certain attitudes and habits—and because they press on, they arrive at the top—*as planned.*

$3.00



Now you can take this proven route to executive success

Here is a practical, inspiring book which brings you this amazing success formula. Written by Howard K. Smith, noted personnel consultant, it outlines a specific, detailed plan for cultivating the qualities which mark the top-flight business leader today—illuminating each point with intimate, on-the-job studies of currently outstanding executives.

SEE THIS BOOK 10 DAYS FREE

McGraw-Hill Book Co., Inc., 330 W. 42d St., NYC 18
Send me Smith's DEVELOPING YOUR EXECUTIVE ABILITY for 10 days' examination on approval. In 10 days I will remit $3.00 plus a few cents postage or return the book postpaid.

Name .....
Address .....
City and State .....
Company .....
Position AW-3-8-48
($3.50 in Canada; order from McGraw-Hill Co. of Canada Ltd., 12 Richmond St. E., Toronto 1.)

services do not appear to offer advantages sufficient to outweigh the possible harmful effects on the services of other carriers," Madden asserted. "Evidence is not convincing that (faster long-haul services) will be available only upon the advent of Pan American to the domestic scene."

► **Fare Level**—The CAB examiner pointed out that if PAA's passenger fares are established at the minimum level consistent with exclusively long-haul operations, its competitors, which must serve low-traffic intermediate points, would be at a distinct disadvantage.

Pan American estimated domestic air travel volume in 1949 would reach 25 billion revenue passenger miles. Of this total, PAA expected to carry 2.5 billion, or 10 percent, if its entire application were granted.

► **Traffic Volume**—Madden observed that United Air Lines' estimate of between 9.5 and 10.7 billion revenue passenger miles in 1949 was probably based on sounder facts and reasoning. (The 1947 total was slightly over 6 billion revenue passenger miles.) The CAB examiner emphasized that PAA did not attempt to argue that large traffic increases could not be handled by existing carriers.

Pan American calculated that the entrance of domestic carriers into the international field will result in reducing PAA's share of the international business from the almost 100 percent it formerly enjoyed to less than 37 percent. Without domestic routes, PAA said it would carry only 6.6 percent of all domestic and international traffic handled by U. S. carriers. With the proposed domestic routes, the percentage would rise to 15.4 percent.

► **Link Favored**—Examiner Madden disputed PAA's contention that its financial position is being weakened because its potential share of the international air travel market has been reduced. He pointed out that during the first seven months of 1947 Pan American carried 64 percent of all international traffic handled by U. S. flag carriers. Madden admitted this would be reduced when Braniff inaugurates South American service and Northwest increases international operations.

While recommending against Pan American's application as a whole, the examiner's report favored the New York - Philadelphia-Baltimore-Washington-Miami link, pointing out that this route would enable PAA to provide a through service between Europe and Latin America. Madden said the number of international travelers that would move over this route far exceeds the number which would move over any other link in the PAA proposal.

"The movement is of such proportions as to raise a serious question as to the propriety of longer withholding from such travelers the advantages of using one carrier for the entire journey," Madden declared.

Feeder To Expand

Arizona Airways, Phoenix, which last month was designated for feeder routes in Arizona, New Mexico and Texas, plans to add five planes to its present fleet of four DC-3s and to expand its personnel from 12 to 270 within the next six months. The carrier flew more than 2,000,000 passenger miles in intrastate service prior to being designated as an inter-state feeder by CAB.

'Skycruise' Case Ruling

CAB public counsel in the 'Skycruise' route case has found that the board has ample power under the Civil Aeronautics Act to issue certificates for all-expense air tours such as those proposed by Resort Airlines, Pinehurst, N. C., and American Air Export & Import Co., Miami Springs, Fla. In addition to roundtrip air transportation, the charge for the proposed tours to vacation points in the U. S., Latin America, Canada and Alaska would include hotel accommodations, meals, sightseeing, ground trips and miscellaneous recreation.

WORLD-WIDE distributors of multi-engine transport type aircraft, engines, their components and accessories. Agent for WAR ASSETS ADMINISTRATION. Write, wire or telephone your requirements.

EXPORTERS
AIRCRAFT-ENGINES
COMPONENTS

FRANK AMBROSE AVIATION COMPANY

39-01 Main Street, Flushing, L. I., N. Y. . . . Cable Address: AIRAMBROSE
Branch Warehouse: Oakland Municipal Airport, Oakland, Calif.

Agents for Frank Ambrose Aviation (Canada) Ltd., Dorval Airport, Montreal, Canada and Frank Ambrose Aviation, S. A., Panama City, R. P.

Established 1923 *U. S. Export License No. 191*

AA Pilot Sisto Faces Certificate Revocation

Former American Airlines Pilot Charles R. Sisto, whose tampering with a DC-4s gust lock mechanism sent the craft into a 7500 ft. dive near El Paso, Texas, last Oct. 8, faces loss of his pilot certificate for at least a year.

The penalty is provided in the initial decision of a CAB safety examiner. If no exceptions are received by the Board before March 19, the initial decision will be adopted by the Board.

The examiner found that Sisto engaged and disengaged the gust lock mechanism, causing the DC-4 to plunge downward and to perform half of an outside loop, endangering the lives of 49 passengers and the crew of five. He added that Sisto demonstrated disregard for the principles of safety with respect to the operation of aircraft and a lack of the discretion and good judgment necessary for the holder of an airman certificate with airline transport pilot rating.

Turner Gets Certificate For Feeder System

Roscoe Turner Aeronautical Corp., Indianapolis, which was designated for a 645-mile feeder system in CAB's Great Lakes Area decision last September contingent on a showing of adequate airports, has been issued its three-year certificate.

The Board found that of the 14 points on Turner's routes, all except Kankakee, Ill., Bloomington, Ind., Bedford, Ind., and Connorsville, Ind., have adequate airport facilities. Until suitable fields are available at the three Indiana cities, Turner will be authorized to operate only between Grand Rapids, Mich., and Indianapolis, and between Chicago and Indianapolis. Service on the Indianapolis-Cincinnati and Indianapolis-Louisville segments will be suspended.

New British Bid

British Caribbean Airways has asked CAB for a foreign air carrier permit to operate between Kingston, Jamaica, and Miami.

CAB SCHEDULE

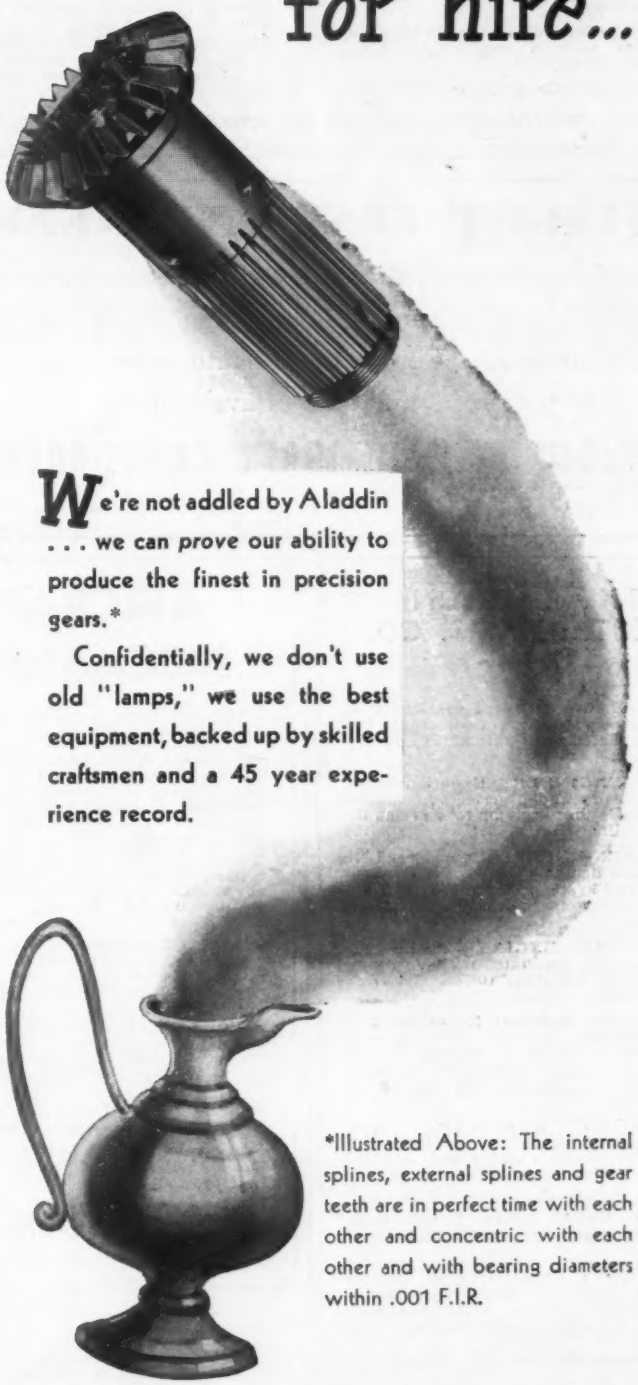
Mar. 8—Hearing on Mid-Continent's application for alternate Kansas City-New Orleans route. Postponed from Feb. 19. (Docket 1956.)

Mar. 15—Hearing on additional service in Hawaiian Islands. (Docket 2390 et al.)

Apr. 5—Hearing on Aerovias Nacionales de Colombia's Bogota-Barraquilla to New York route case. (Docket 3249.)

May 15—Hearing on Capital Airlines (PCA) mail rate case. (Docket 484.)

Gear Genii for hire...



We're not addled by Aladdin . . . we can *prove* our ability to produce the finest in precision gears.*

Confidentially, we don't use old "lamps," we use the best equipment, backed up by skilled craftsmen and a 45 year experience record.

*Illustrated Above: The internal splines, external splines and gear teeth are in perfect time with each other and concentric with each other and with bearing diameters within .001 F.I.R.

Indiana GEARS

GEARS • CAMS • INTRICATE AND PRECISE MACHINE PARTS

INDIANA GEAR WORKS • INDIANAPOLIS 7, IND.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • PLANES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE

60¢ a line, minimum 4 lines. To figure advance payment count 5 average words as a line.

POSITIONS WANTED (full or part-time individual salaried employment only), ½ above rates.

PROPOSALS 60¢ a line an insertion.

INFORMATION

BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count 1 line additional in undisplayed ads.

DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE

The advertising rate is $9.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS received Friday will appear in the issue mailed the following Friday subject to limitation of space available

A.W.

FLIGHT TEST ENGINEERS

Several experienced flight test engineers required, who are capable of planning long range flight test guided missile program. Reply should state experience, education, salary desired, and date of availability.

McDONNELL AIRCRAFT CORPORATION

P. O. Box 516 — St. Louis 3, Missouri

THE EMERSON ELECTRIC MFG. CO. *NEEDS*

RADAR ENGINEERS: Experienced in the theory and design of electronic circuits associated with automatic gun laying radars.

RADAR ENGINEER: Experienced in general theory and practice of complete radar gun laying systems to serve as design coordinator.

RADAR ENGINEER: Experienced in theory and design of radar R. F. Components and systems. Familiar with and able to apply associated mathematical concepts.

ELECTRICAL ENGINEER, ASSISTANT: Recent graduate, with Army or Navy radar training, to do electronic circuit work.

ENGINEERS, SERVO: Experienced in the theoretical analysis of servo systems, design of servo system components, system compensation, network analysis, feedback amplifier design and simulation.

ELECTRONIC ENGINEER: Experienced in the design of low-frequency electronic circuits, design and application of feedback amplifiers, regulated power supplies, D. C. amplifiers.

STRESS ENGINEERS: Three years minimum experience in aircraft stress analysis.

PHYSICISTS: Experienced in the design and analysis of feedback amplifiers and servomechanisms. Must have thorough background in mechanics.

Salary commensurate with experience.

Write, giving complete information to W. N. Kennedy, Director of Personnel, The Emerson Electric Mfg. Co., 8100 Florissant Ave., St. Louis 21, Mo.

WHEN *Answering Advertisements*

PLEASE *do not send original letters, certificates or photographs. We cannot be responsible for their return. Please send photostat or carbon copies.*

AIRCRAFT MECHANICS

DO you want to obtain your CAA certificate and ratings?

The books in the new Drake Aircraft Mechanic Series, written by a former Chief of the CAA Airmen Agency Unit, teach you in complete, clear, authoritative detail what you need to know to pass your tests.

AIRCRAFT WOODWORK. Full instruction on woods and their selection; construction, approved repair of all wood, plywood, fabric-covered parts. $3.50.

AIRCRAFT WELDING. Characteristics and treatment of metals and alloys; all basic and special techniques for each; detection of flaws; approved repairs. $4.00.

AIRCRAFT SHEET METAL. Characteristics and treatment of metals and alloys; all operations, special methods, approved repairs. $5.50.

Books on engines; electrical, hydraulic systems & instruments; aircraft & engine maintenance and service in press.

Let us send you copies ON APPROVAL. See for yourself how valuable they will be to you. Write to

THE MACMILLAN COMPANY

60 Fifth Ave. — New York 11

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

WANTED—A&E Mechanic—Preferably designated aircraft maintenance inspector—to take charge of approved repair station, including complete machine shop, sheet metal, welding, paint and carpenter shops. Give qualifications first letter. For full particulars write P-4097, Aviation Week.

POSITIONS WANTED

COMMERCIAL PILOT, 1200 hours twin engine, 200 hours single engine experience, age 30, married, desires position in aviation. Will consider offers with a future anywhere. PW-3714, Aviation Week.

Available

AIRCRAFT RADIO SALES MANAGER

Qualified to head up your sales department, experienced in setting up merchandising policies, with nation-wide distribution and service, promotional and sales literature, space advertising, publicity, legal training also, many valuable contacts in aircraft industry. Currently employed. Good reason for desiring change. Compensation important but secondary to permanent congenial connection.

SA-4139, Aviation Week
520 North Michigan Ave., Chicago 11, Ill.

POSITIONS WANTED

EXPERIENCED PILOT, Airline Transport Rating—experienced on all types air planes, have done extensive flight testing, instructing and weather flying. Age 26, married, will travel anywhere if position as executive pilot with stable future. All replies will be answered, am available immediately. PW-4073, Aviation Week.

COLLEGE INSPECTOR—Mechanical and aeronautical engineering. Desires position with opportunity to do doctorate work in mechanical or aeronautical engineering. Six years total industrial and teaching experience. Available by fall semester. Full information gladly sent on request. PW-4144, Aviation Week.

COMMERCIAL PILOT, 800 hours C-46, 2200 single engine, age 29, married, reliable, 3 yrs. college Agric. Eng. Desires position flying for company or individual. PW-4092, Aviation Week.

FOR SALE

Sacrifice Sale!
Beautifully reconverted B-25 in A-1 condition. Write for details C. R. Bates, 500 Young Avenue, Chattanooga, Tennessee.

For Sale C-54A Aircraft
Zero time since major overhaul on airframe and engines, licensed CAA as cargo carrier, equipped with R-2000-7 engines, airframe approximately 3200 hours since new, full compliance fire-preventative bulletins—Price $138,000.00. C-54A Aircraft—Zero time since major overhaul on airframe and engines, licensed CAA as scheduled 44-passenger airliner with new standard airline interior, equipped with R2000-7 engines, airframe approximately 3500 hours since new, full compliance fire preventative bulletins, auxiliary fuel tanks installed in inner wing—Price $195,000.00. Prices will be submitted upon request for conversion of the above aircraft to modified B type, including installation of B wing panels. Send reply to: Texas Engineering & Manufacturing Company, Inc., P.O. Box 6191, Dallas, Texas, Telephone Madison-8141, or to Washington, D. C., office: Suite 308-9 Central Building, 805 G. Street, N.W., Washington, D. C., Telephone Metropolitan-3116.

Grumman Widgeon
Excellent condition, purchased new July 1944 airframe time 1350 hours, left, engine 10 hours since overhaul, right engine 215 hours since overhaul, metal propellers. For further details contact S. P. Gilley, Union Oil Company of California, 1134 Commerce Building, Houston, Texas.

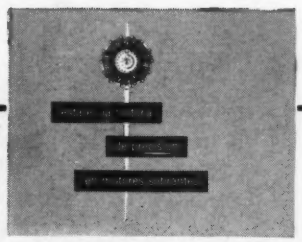
Twin Engine D-18-S Beechcraft
Total time engines and aircraft 481:00 since new. Five beautifully upholstered reclining chairs. Completely equipped for instrument and night operation. Dual ADF, Lear UT-6 transmitter, range receiver, marker beacon receiver. This airplane powered with Pratt & Whitney R-985-AN-4 engines. Excellent condition throughout. Price upon request. FS-4143, Aviation Week.

(Continued on opposite page)

the steward-davis 100-hour warranted

R-1830-92 *conversion*

$1795 f.o.b. Los Angeles . . .



FOR ADDITIONAL DETAILS: Send for *"The Story of Precision in Surplus Engines,"* containing the exact steps of the Steward-Davis Conversion Operation in illustrated detail. Available in English and Spanish.

STEWARD-DAVIS • 13501 S. WESTERN • GARDENA, CALIF.

GENERAL MAGNESIUM FOUNDRIES, INC.
612 South Third Street Belleville, Illinois
MAGNESIUM CASTINGS
"AIRCRAFT SPECIALISTS"
U. S. A. F. CERTIFIED HEAT TREAT FACILITIES

FOR SALE

For immediate sale
one Set C.A.A. approved Floats for Bell 47-B Helicopter. G. D. Kelsey, Southwest Municipal Airport, Philadelphia 42, Pa.

Stinson L-5,
unexcelled for short take-offs. Radio, starter, licensed day-night, recent 100 hour check, low hours, very excellent condition, $2200. C. E. Foote, 208 North 37th St., Omaha, Nebr.

Batteries:
New, for all types of aircraft. AN 3150, heavy duty, 24 V. 34 Amps $29.00 dry Fits UC78, Cessna, P38, etc. AN3151, 24V 17 Amps. Shielded, $24.75 dry Fits AT7, AT11, Twin Beech, T50, Cessna, etc. AN3152, 12V 34 Amps. $19.75 dry Fits AT19, Stinson BT13, PT23 and T50 Cessna. NAF1062-17, smaller 12V 17 Amps $17.00 dry, Fits L3, L5, PT19, etc. D88-Heavy duty, 12V 89 Amps $52.50 dry Fits DC3, C47, Conestoga, etc. TPWS-13-16. 12V. 63 Amps. $47.50 dry Fits BT13 and AT6. AW-1225-12V 24 Amps $27.85, dry. Fits Cub Cruiser, Luscombe, etc. Sky-6V, 10 Amps. Wt. 8# $14.95 dry Fits Piper Cubs. Add $4.00 for charging. Cannon quick-disconnects available for AN series at $3.50 extra. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. AW, Chicago 13, Ill.

Genuine Navy Intermediate Jacket,
new, dark brown goatskin leather with mouton fur collar, bi-swing back, celanese lined, zippered, elastic-knit waistband and cuffs, sizes 34 to 48...$35.00. A2 Army type, Flight Jacket, select dark brown horsehide leather, cloth lined, zippered, elastic-knit waistband and cuffs, sizes 34 to 44...$18.75. Flying Equipment Co., 1641-5 W. Wolfram St., Dept. AW, Chicago 13, Ill.

If you don't see
what you want . . . ask for it

IF you don't see the equipment advertised that you want, ask for it—ask the advertisers—or we will gladly ask them for you.

Classified Advertising Division
AVIATION WEEK
330 W. 42nd St. New York 18, N. Y.

FOR SALE
$25,000,000 P&W PARTS
$2,000,000 DC-3 PARTS
$1,000,000 PROPELLERS
$1,000,000 INSTRUMENTS
$1,000,000 O'HAUL TOOLS
$5,000,000 ACCESSORIES
PRICED BELOW GOV'T. COST
Prompt attention will be given to all requests for quotations. Mdse. located at our Glendale Whse.
AIR-PARTS INC.
723 SONORA AVE., GLENDALE 1, CALIF.

C A V U
COME AND VISIT US
We're distributors for Beechcrafts, Bendix and ARC radios. Our Certified Beechcraft Service provides 100-hour inspections and general maintenance by factory-trained mechanics—and our installation and service division is the finest in the east. COME AND VISIT US —or our Boston base at Bedford Airport.
Atlantic Aviation CORPORATION
TETERBORO AIRPORT
TETERBORO, N. J.
PHONE: HASBROUCK HEIGHTS 8-1740

FOR SALE
BY
AMERICAN AIRLINES, INC.
43-02 Ditmars Blvd.
Astoria, L. I., New York

- Douglas DC-3 Airplane Parts, Accessories and Ground Equipment.
- Wright G-102 (C9GB) Engine Parts, Accessories and Components.
- P&W R-1830-92 Engine Parts, Accessories and Components.

• ALSO •

- Douglas DC-4 Airplane Parts, and Accessories.
- P&W R-2000-13 Engine Parts, Accessories and Components (many of which are interchangeable with R-2000-7-9-11 Engines).

These inventories are available for inspection at our warehouses at Astoria, L. I., New York, Tulsa, Oklahoma and Fort Worth, Texas and offered FOB these points for domestic shipment at very attractive prices.

PROMPT ATTENTION WILL BE GIVEN TO ALL REQUESTS FOR QUOTATIONS DIRECTED TO THE ATTENTION OF THE SUPERINTENDENT OF STORES AT THE ABOVE ADDRESS.

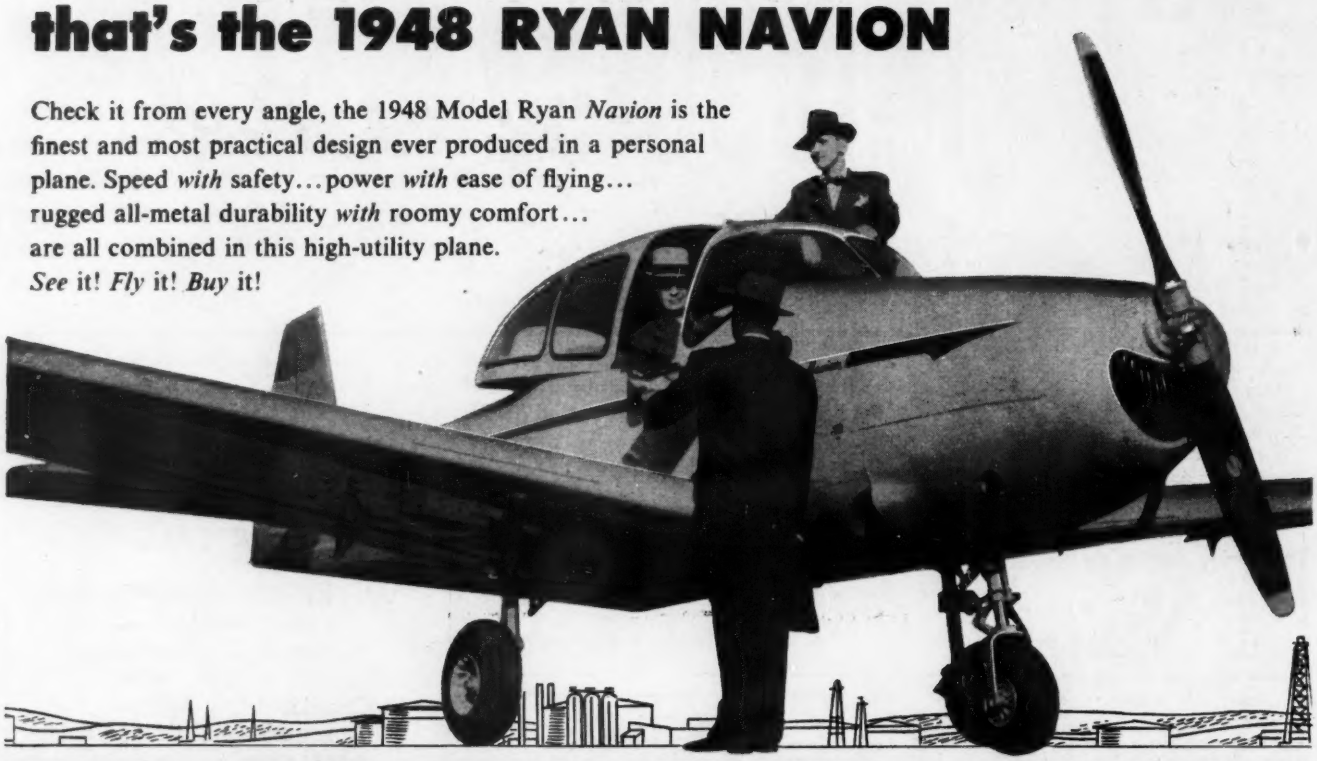
SCHOOLS

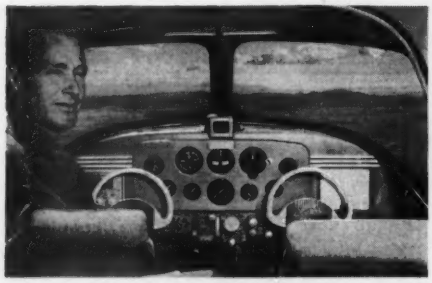
When You Need Quick Action . . .
on Opportunities available or wanted in Aviation Week . . . USE
THE SEARCHLIGHT SECTION

Rising Sun SCHOOL OF AERONAUTICS
ESTABLISHED 1930
"Built Upon the Success of its Graduates"
GOVT. C.A.A. and VETERANS APPROVED
ENROLL NOW FOR NEXT CLASS
Write for Illustrated Catalog
2206-16 E. HUNTINGDON ST., PHILA., PA

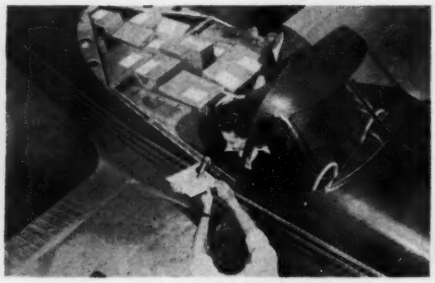
Fast AND Safe...Rugged AND Roomy... that's the 1948 RYAN NAVION

Check it from every angle, the 1948 Model Ryan *Navion* is the finest and most practical design ever produced in a personal plane. Speed *with* safety...power *with* ease of flying... rugged all-metal durability *with* roomy comfort... are all combined in this high-utility plane. *See* it! *Fly* it! *Buy* it!





"EASIEST TO FLY," say both beginner and veteran after a turn at the *Navion's* wheel. Amazing stability featuring patented interconnected rudder and ailerons gives optional, coordinated two-control system... assures smooth flying—even in rough air. Visibility is unequalled by any other 4-place plane.



PRACTICAL AND USEFUL, the *Navion* is quickly converted to a light transport. Remove three seats and the *Navion* will fly 645 pounds of extremely bulky cargo (55 cu. ft.) plus pilot and sufficient fuel for economical nonstop flights of 500 miles. Canopy is temporarily removable.

ONLY 335 FEET TO LAND; 560 FEET TO TAKE OFF—that's *Navion* performance! Variable-pitch propeller and 185 hp engine give a safe, high rate of climb. Hydraulic flaps, shock absorbers, and tricycle landing gear with *steerable nosewheel* mean easy landings, even in cross winds and on soft or rough fields.

NEW FEATURES FOR '48

1. **BEAUTIFUL HIGH GLOSS ENAMEL FINISH.** Standard models now delivered in choice of 4 colors.
2. **NEW INTERIOR STYLING.** More comfort and convenience than ever before.
3. **IMPROVED DRAFT-FREE VENTILATION.** Greater air circulation and better temperature control.
4. **PERFECTED SOUND INSULATION** permits talking in normal voice or listening to broadcasts from optional dome speaker.
5. **COMPLETELY NEW FUEL SYSTEM** incorporating a reserve auxiliary electric fuel pump.
6. **FURTHER MECHANICAL REFINEMENTS** result in better performance from airplane, engine and propeller.
7. **RANGE INCREASED** to 750 miles at cruising speed with 20-gal auxiliary tank, optional equipment.

We invite you to try the 4-place, 150 mph 1948 *Navion*. It's the plane that's been Ryan-refined to matchless perfection...constantly improved by tens of thousands of hours of actual performance under *all* conditions. Orders filled in sequence. Write today on your letterhead for fully illustrated brochure and a demonstration by your nearest dealer.

NEW *Navion* By RYAN

Rely on Ryan RYAN AERONAUTICAL COMPANY, 403 Lindbergh Field, San Diego, California

ADVERTISERS INDEX

AVIATION WEEK

MARCH 8, 1948

Aircraft Radio Corp..... 8
Agency—Burke, Dowling, Adams, Adv.

Ambrose Aviation Co., Frank..... 44
Agency—Steedle, Rankin & Boyle, Inc.

Bendix Aviation Corp. (Eclipse-Pioneer Div.) 28
Agency—MacManus, John & Adams, Inc.

Bowser, Inc. 42
Agency—Willis S. Martin Co.

Bridgeport Fabrics, Inc..... 24
Agency—Henry A. Loudon Adv.

Clifford Manufacturing Co..... 25
Agency—James Thomas Chirurg Co.

Electric Auto-Lite Co., The..... 34
Agency—Ruthrauff & Ryan, Inc.

Garrett Corporation, The..... 38
Agency—J. Walter Thompson Co.

General Controls Co..... 23
Agency—The McCarty Co.

General Electric Co. (Apparatus Dept.) Second Cover
Agency—G. M. Basford Co.

Goodyear Tire & Rubber Co., Inc...Front Cover
Agency—Kudner Agency, Inc.

Gordonay Products Co..... 42
Agency—Seemann & Peters, Inc.

Hydro-Aire, Inc. 3
Agency—John H. Riordan Co.

Indiana Gear Works..... 45
Agency—A. L. Perkins & Co.

Jack & Heintz Precision Industries, Inc..... 32
Agency—The Griswold-Eshleman Co.

McGraw-Hill Book Co., Inc..... 44

Macmillan Co., The 4
Agency—Atherton & Currier, Inc.

Nelson Corp., The Herman..... 41
Agency—The L. W. Ramsey Adv. Agency

New Departure Div..... 10
Agency—J. M. Hickerson, Inc.

Pyrene Co., Ltd., The..... 22
Agency—Nelson Adv. Service, Ltd.

Reeves Brothers, Inc..... 5
Agency—Goold & Tierney, Inc.

Ryan Aeronautical Co..... 48
Agency—Batten, Barton, Durstine & Osborn, Inc.

Searchlight Section 46, 47

Sherwin-Williams Co., The..... 27
Agency—Newell-Emmett Co.

Socony-Vacuum Oil Co., Inc..... 19
Agency—Compton Adv., Inc.

Sperry Gyroscope Co..... 6
Agency—Charles Dallas Reach Co., Inc.

Standard Oil Co. of N. J..... 31
Agency—McCann-Erickson, Inc.

Tinnerman Products, Inc.....Third Cover
Agency—Meldrum & Fewsmith Adv.

U. S. Plywood Corp..... 9
Agency—Marschalk & Pratt Co.

Utica Drop Forge & Tool Corp..... 49
Agency—Deveruex & Co., Inc.

Westinghouse Electric Corp.....Fourth Cover
Agency—Fuller & Smith & Ross, Inc.

Whitehead Stamping Co..... 44
Agency—Holden, Clifford, Flint, Inc.

◆

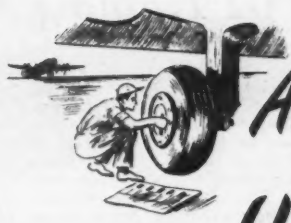
SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT
Positions Vacant..... 46
Positions Wanted..... 46

SPECIAL SERVICES
Contract Work..... 47

EDUCATIONAL
Schools 47

EQUIPMENT
(Used or Surplus New)
For Sale.....46, 47



Aircraft Mechanics choose UTICA TOOLS

Being *sure* is a necessity for aircraft mechanics. That's why they choose UTICA TOOLS . . . for dependability and more tool mileage!

OUR PRECISION FORGINGS PLANT is the only one in America devoted exclusively to the production of precision Forged Blades for Gas Turbines!

U TI CA
Utica Tools
FOR MORE TOOL MILEAGE

UTICA DROP FORGE and TOOL CORPORATION
UTICA 4, NEW YORK

Charges Against GI Training Are Challenged

(The most effective reply yet written to recommendations that the servicemen's readjustment act be amended to restrict aviation training is digested on this page. James W. Batchelor Washington attorney, has forwarded a 10-page letter to the House Committee on Veterans Affairs, which is gathering evidence on both sides of the controversial matter. Both the Budget Bureau and the Veterans Bureau have recommended changes. Ed. Note)

It is my belief the committee is interested in facts.

Value of Training—To condemn the acquisition of education or training because there appears to be no immediate opportunity to convert it into money is to condemn the fundamental basis of our educational system.

The Budget Bureau has suggested that the act be amended to require that all courses must be vocational in character or for the occupational advancement of the veteran, except those in elementary, secondary schools and schools of higher learning.

Veterans Administration would tell the veteran what course he shall take, by refusing to approve other courses on the ground that the course elected by the veteran is not "likely to be of vocational use."

The committee should not forget that . . . the airplane is becoming more interwoven in our national economy . . . airplanes in personal and business use are increasing about 15,000 per year, and if present rates of increase continue, the ability to operate an airplane will become essential to advancement in many fields of endeavor where business or personal transportation plays an important part.

Bureau Recognizes Only Airlines—Budget Bureau figures are grossly misleading as presented. It is stated "more than 90 percent of all flight training serves no occupational purpose. Aviation pilot training outside the military establishment has one major vocational use—employment by commercial airline companies." This statement is not true. The principal employers of trained pilots are not "commercial airline companies". They are companies and persons who have no connection whatever with the airlines.

There were 18 domestic trunk airlines, 6 international airlines and 7 local service airlines in operation on Sept. 30, 1947.

Certificated airline pilots Jan. 1, 1948, totaled 7750. Contrast this with 2496 non-scheduled air carriers on Dec. 31, 1947, employing 10,726 pilots. Add to this 3115 CAA approved flight schools on Jan. 15, 1948, employing 15,575 rated flight instructors. According to CAA, airlines were operating only 969 aircraft on Feb. 1, 1948, compared to 5626 aircraft operated by non-scheduled air carriers on Sept. 30, 1947.

Registered aircraft on Nov. 1, 1947, totaled 92,644 of which 30,537 were single engine. CAA on Oct. 11, 1947, said 51 percent of the planes in operation are engaged in personal flying, of which 29 percent is for business and 23 percent is for transportation for hire or other revenue producing flights. Volume of flying has increased more than 2½ times since 1942. Based on these figures 41,174 aircraft were engaged in personal flying, of which 23 percent was revenue producing requiring 9470 commercial pilots, and 29 percent business-connected requiring 11,840 pilots with private and commercial licenses.

Total requirements for non-airline pilots are as follows:

Non-scheduled air carriers	10,726
Employed flight instructors	15,575
Flying for hire	9,470
Business related personal pilots	11,840
Total non-airline pilots required	47,611

Thus the employment of airline pilots (7750) becomes only 16.3 percent of the number employed for non-airline purposes.

Course Figures Misleading—The Bureau's exhibit shows enrollment in 339,300 flight training courses to Nov. 1, 1947. No effort was made to point out that a single veteran who obtains an airline pilot rating has enrolled in four courses before obtaining his rating; that a flight instructor has enrolled in three courses; a commercial pilot in two courses and an instrument pilot in two courses. When the duplications in enrollments are eliminated the total number of veterans receiving flight training will be reduced to approximately 50 percent of the total indicated by the exhibit attached to the Budget Bureau's study.

Advanced Courses Sometimes Unnecessary—Considerable emphasis is placed on the fact that 84,900 veterans completed private pilot courses but did not go on to advanced courses. Inference is that flight training is of no vocational value to these veterans. Reference to section 43.60, civil air regulations, discloses that "a private pilot shall not pilot aircraft for hire." A footnote states "this rule permits sharing the expenses of a flight or piloting aircraft in furtherance of a business when the flight is made solely for the personal transportation of the pilot" . . . Unless the veteran intends to use his pilot training for a purpose requiring a commercial license there is no reason for him to enroll in an advanced course unless he desires an instrument rating course . . . Veterans who have completed commercial, flight instructor and instrument courses total 18,600. Many are already employed. Those in training (54,400) are barely sufficient to replace the present non-airline minimum requirements (47,611).

Airline Waiting List Irrelevent—Reference was made to waiting lists of pilots reported by some of airlines. The applicants referred to are not properly rated airline pilots. They seek training to qualify for airline pilot jobs.

Defense Incidental In This Law—Much emphasis has been placed on the alleged value of aviation training of veterans to the national defense. Though this consideration should not be overlooked, it should be remembered that whatever benefit accrues to the national defense is incidental to the principal purpose of the act, which is to provide educational training to the veteran.

Congress did not intend that "value for national defense" should become the basis on which the veteran's right to education and training should be determined. The act expressly provides that the veteran should elect the course which he would pursue.

"Expensive Training"—Aviation training is also attacked on the ground that it is expensive. That flight training costs more than many other courses cannot be denied but Congress apparently took into consideration the fact that certain courses which the veteran might elect would be expensive. The act provides that the veteran may elect to have his training paid for at an accelerated rate and the cost in excess of $500 per school year "shall be charged against his period of entitlement the proportion of an ordinary school year which such excess bears to $500". If we use the figures of the Budget Bureau (339,300 courses costing $193,000,000 for tuition) the average cost of all such courses is only $569 compared to the average cost of $340 for the usual academic course.

If the veteran enrolls in flight training the cost of subsistence is much less than for other courses because an entitlement of four school years can be exhausted in one year. Four years subsistence at $75 per month totals $3600 for an unmarried veteran compared to $900 maximum subsistence which will be paid if the veteran enrolls in flight training. The saving of $2500 on subsistence is $500 more than the total cost of flight training acquired through the use of a four year entitlement. If the veteran has one dependent the saving on subsistence is $3780, which is $1780 more than the total cost of the training. For a veteran with more than one dependent the saving is $4320, or $2320 more than the total tuition for aviation training. Though the tuition charges for aviation training are higher than for other courses, the total cost to the government is much less because of the saving on subsistence payments.

If the Veterans Administration had spent $193,000,000 on regular academic courses, where tuition averages $340 per school year, the number of school years involved would have been 567,647. Subsistence at $75 per month for 567,647 years would total $510,882,300, which is $277,882,300 more than the total cost of tuition and subsistence for flight training from the beginning of the program to Nov. 1, 1947.

Therefore, instead of flight training costing the government **more** money than other types of training would have cost, it has cost the government $277,000,000 **less** than regular academic courses would have cost.

Flight Training Figure Wrong—Another gross inaccuracy of the Bureau's study is the statement that flight training on Nov. 1, 1947 was costing the government at the rate of $257,000,000 annually. This contradicts the Bureau's previous statement that in two years prior to Nov. 1, 1947 the government has spent only $233,000,000, including subsistence—an annual rate of $116,500,000. Flying school revenues from veterans training have decreased from 25 percent to 30 percent from the two preceding years which indicate the cost should be from $81,550,000 to $92,375,000 annually, including subsistence, instead of $257,000,000 forecast by the Budget Bureau. The Bureau may have selected the peak month during 1946 or 1947 and projected it to a twelve months basis to arrive at the fantastic figure of $257,000,000 as the annual cost of flight training. If flight training cost an average of $116,500,000 for the two preceding years and the peak of training is past, the cost cannot reasonably be expected to exceed or even approach the average annual expenditures for the past two years.

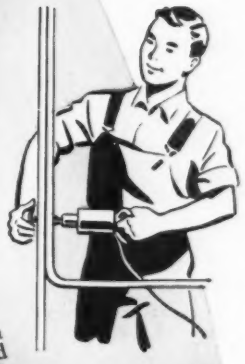
The estimate of $257,000,000 annually is also disproved by another basis of comparison based on the Budget Bureau's figures. If the 118,400 courses in which veterans were enrolled on Nov. 1, 1947, are multiplied by $569 (the average cost of each course), the total cost would be $67,369,600. Inasmuch as only 33.74 percent enroll in advanced courses the total annual cost would be $90,100,403. This closely parallels the previous estimate obtained by using the annual rate of $116,500,000 based on two years experience and reducing it 25 percent because of decrease in total flight school revenues from G I flight training. **The difference between these estimates is $2,274,596.96—only 2.2 percent. Therefore the Budget Bureau's figure of $257,000,000 is disproved by both methods of computation based on its own figures.**

Keep CAA Out—The suggestion has been made that Congress should authorize the Civil Aeronautics Administration to supervise flight training under the G I bill. This proposal is unsound.

Cases of Abuse Negligible—Individual cases of abuse represent a negligible percentage of the program. According to the Budget Bureau there were 3616 schools operating for profit engaged in aviation training on Nov. 1, 1947. If 300 of them are engaged in sharp practices, which is less than 10 percent, congress would not be justified in depriving the veteran of the opportunity to choose this type of training because 10 percent of the schools are not operated as they should be. Sound judgment requires that schools engaged in sharp practices and abuses be ferreted out and their contracts cancelled. That is the job of the veterans administration in cooperation with the state accrediting agencies.

The intent of Congress as I interpret it from the provisions of the act itself are being effectively carried out to the best interests of the veterans and with minimum cost to the taxpayers. The charges of the Budget Bureau and the Veterans Administration on which the proposed changes are based are not substantiated by their own statistics and I believe the veterans themselves are strongly opposed to the changes suggested.

Which of These Speed Nut* Advantages Will Profit You Most?



✓ APPLIED FASTER

SPEED NUTS start easily, run freely on threads, and tighten into a Double-Locked position *without being held with a wrench.* The push-on types zip over unthreaded studs even faster.

✓ ELIMINATE ASSEMBLY STEPS

Many types of SPEED NUTS hold themselves in bolt-receiving positions—no welding, clinching, or riveting necessary. Also, SPEED NUTS require no masking before painting, no tapping of threads after painting.

✓ PERFORM MULTIPLE FUNCTIONS

One multi-purpose SPEED NUT often replaces two, three, or more parts, thereby eliminating assembly steps and reducing time and material costs.

● Today, SPEED NUTS are cutting assembly costs for thousands of users. Example: One manufacturer of motion picture cameras and projectors reports a 36% saving . . . thanks to SPEED NUTS.

You, too, can counteract rising manufacturing costs by applying the SPEED NUT System of Fastenings to your product.

Tinnerman engineers are prepared to conduct a fastening analysis from your blue prints or actual assemblies. Complete information on this service, plus your copy of the new SPEED NUT bulletin, will be sent on request. TINNERMAN PRODUCTS, INC., 2038 Fulton Rd., Cleveland 13, Ohio.

In Canada: Dominion Fasteners Limited, Hamilton
In England: Simmonds Aerocessories, Ltd., Treforest
In France: Aerocessoires Simmonds, S. A., Paris

TINNERMAN

Speed FASTEST THING IN FASTENINGS *Nuts*

*Trade-Mark Reg. U. S. Pat. Off.

MORE THAN 4000 SHAPES AND SIZES

RESEARCH AND DEVELOPMENT TODAY . . .

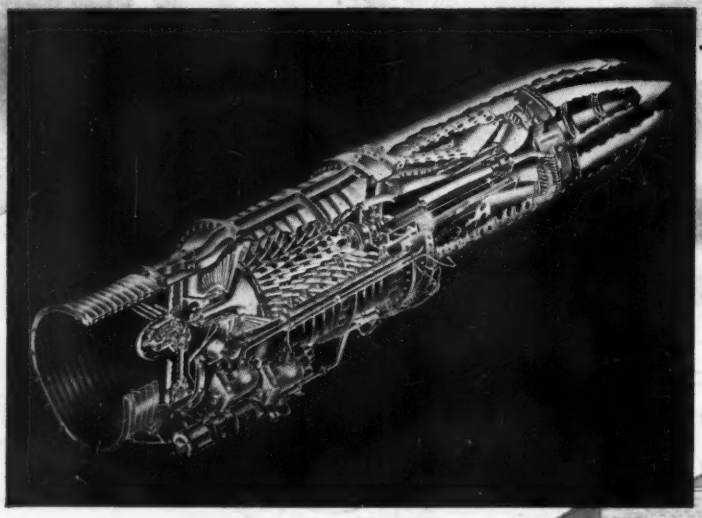
FOR THE WINGS OF *Tomorrow!*

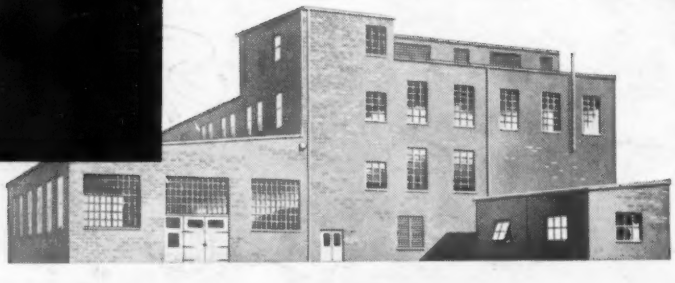
New frontiers in the field of Jet Propulsion are explored with intense and continuous research and development at the Westinghouse Gas Turbine Laboratory.

Axial-flow design, pioneered by Westinghouse, is a result of these efforts. Axial-flow "Yankee" Turbojet engines contribute immeasurably to the sleek design, light weight and unprecedented power that characterizes advanced military aircraft.

Westinghouse will continue to produce new and improved "Yankee" Turbojets for the aviation industry . . . setting the pace for the latest advancements in aircraft engines. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-50483

The "Yankee" Line of Turbojet Engines



Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE